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TENEYCK.

VOLUME XV.
NUMBER 5.

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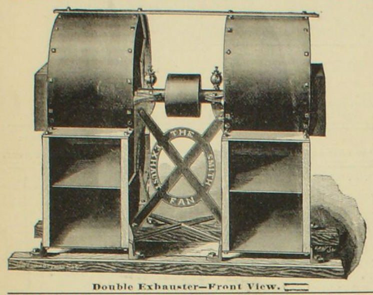

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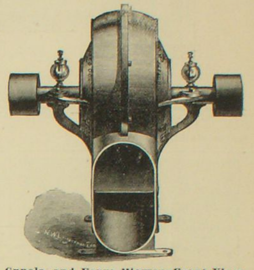

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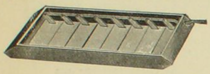

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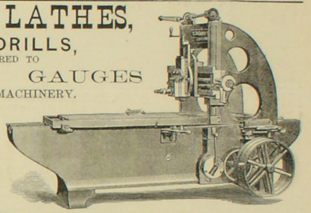

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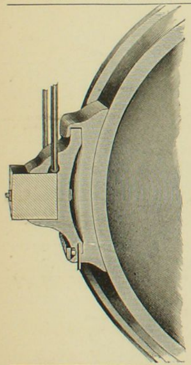

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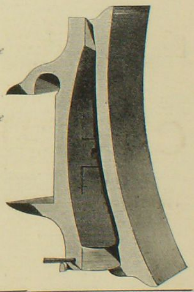

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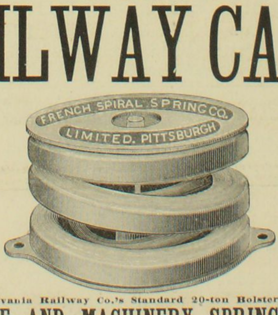

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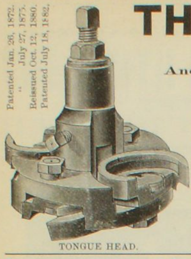

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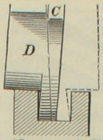

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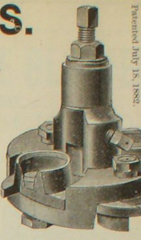

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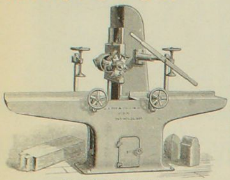

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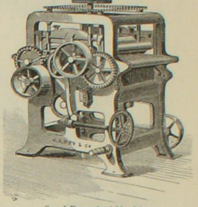

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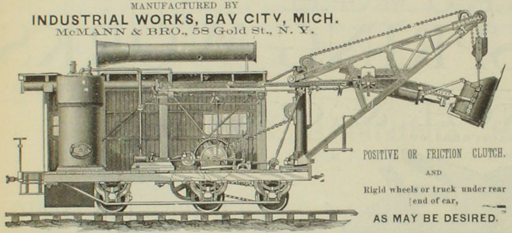

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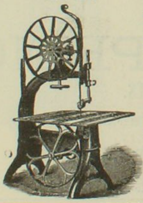

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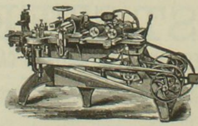

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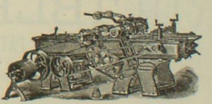

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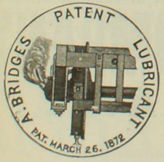

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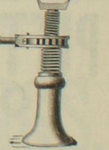

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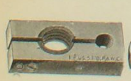

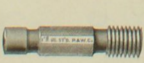

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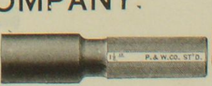

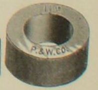

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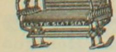

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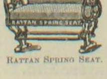
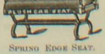
AND ONE HUNDRED OTHERS.



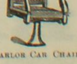
RATTAN SPRING SEAT.

EXTENSIVE MAKERS
OF
PATENTED CAR SEATS
AND
SPRINGS.



SPRING EDGE SEAT.

ESTIMATES,
CIRCULARS
AND
SAMPLES FURNISHED
ON
APPLICATION.



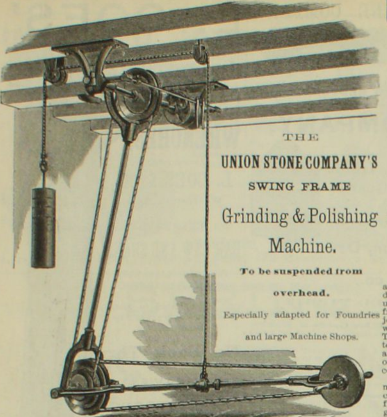
PARLOR CAR CHAIR

UNION STONE COMPANY,

38 and 40 HAWLEY ST., BOSTON, MASS.,

PATENTEES AND MANUFACTURERS OF THE

UNION EMERY WHEEL.

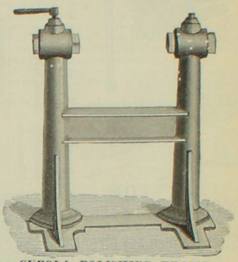


THE
UNION STONE COMPANY'S
SWING FRAME
Grinding & Polishing Machine.
To be suspended from overhead.
Especially adapted for Foundries and large Machine Shops.

Emery Wheel Machinery and Tools a Specialty.
Automatic Knife-Grinding Machines.
WOOD-POLISHING WHEELS,
EMERY, QUARTZ, CORUNDUM,
GRINDERS' AND POLISHERS' SUPPLIES.
Catalogue on Application.

The work is placed on the floor, bench or truck, the emery wheel is swung at will to conform to the straight or uneven surface. The wheel, being driven from a swinging countershaft, suspended by a telescopic rod with a universal joint, may be carried back and forth or swung at will; and the frame carrying the wheel being also suspended by the counterpoise weights jointed to a similar horizontal telescopic rod, makes it easy to twist the wheel over to any angle or give it any range of movement up or down. The operator can seize the handles on each side of the wheel, and carry it to any portion of the work desired. A boy can operate it. By substituting a circular "Scratch Brush" for the wheel, its value in the cleaning room of a foundry is apparent to all familiar with the old laborious hand process.

The machine is also a valuable accession to the machinery of any general machine shop, for grinding off fins, spurs and imperfections, instead of chipping and filing. It leaves the work looking better, and may be performed by a cheaper hand; and by substituting a polishing wheel for the grinding wheel, the work can be finished to a fine polish.

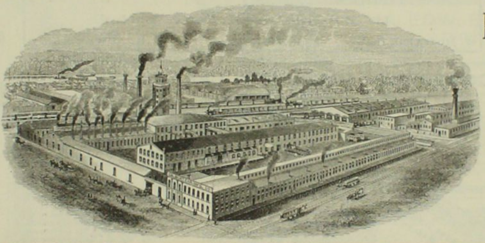


CUPOLA POLISHING FRAME.

GILBERT CAR MANUFACTURING COMPANY, TROY, N. Y.

URI GILBERT, Prest. and Treas. EDWARD G. GILBERT, Vice Prest. and Asst. Treasurer WM. E. GILBERT, Secretary. DAVID HOIT, Superintendent.

MANUFACTURERS OF
ALL KINDS AND SIZES OF
Steam and Street
RAILWAY CARS.



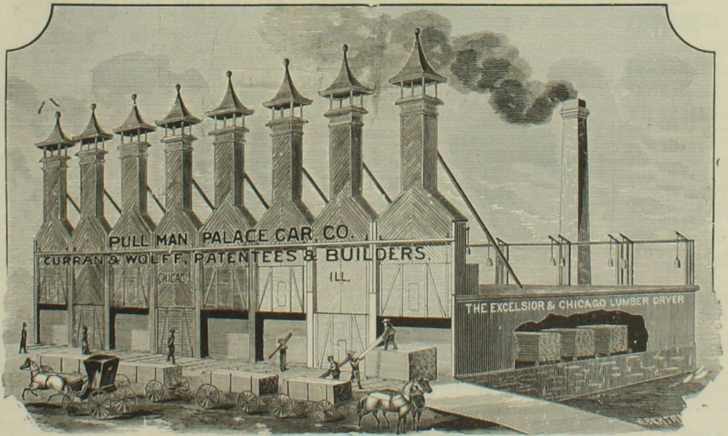
Building, Dissecting and Packing Cars for Export a Specialty.

—ESTABLISHED 1820.— —INCORPORATED 1879.—

THE EXCELSIOR AND CHICAGO LUMBER DRYER IS BUILT UNDER 16 PATENTS.

PAYS FOR ITSELF EVERY YEAR.

Storing Capacity. 40 000 Feet Inch Lumber.


PULLMAN PALACE CAR CO.
CURRAN & WOLFF. PATENTEES & BUILDERS.
CHICAGO
ILL.
THE EXCELSIOR & CHICAGO LUMBER DRYER

DRYING 8,000 FEET PINE LUMBER

EVERY 24 HOURS.

RAILROAD COMPANIES AND CAR-BUILDERS WHO ARE USING THE EXCELSIOR AND CHICAGO LUMBER DRYER:

	Kilns.		Kilns.		Kilns
C. & N. W. R. R. Co., Chicago	2	C., B. & Q. R. R. Co., Aurora, Ill	2	Harlan & Hollingsworth Co., Car-Builders, Wilmington, Del	2
B. & M. R. R. R. Co., Omaha, Neb	1	N. Y., O. & Western R. R. Co., Middletown, N. Y	1	Billmeyer & Small Co., Car-Builders, York, Pa	1
Norfolk & Western R. R. Co., Roanoke, Va	2	Louisville & Nashville R. R. Co., Louisville	2	Southern Car Co., Car-Builders, Knoxville, Tenn	1
Wilmington & Weldon R. R. Co., Wilmington, N. C	2	Pullman Palace Car Co., Chicago	8	Georgia Car Co., Car-Builders, Cartersville, Ga	1
Denver & Rio Grande R. R., Denver, Col	2	Wells & French Co., Car Builders, Chicago	3	Gilbert & Bush Co., Car-Builders, Troy, N. Y	1
A. T. & S. Fe R. R., Topeka, Kan	2	Michigan Car Co., Car Builders, Detroit, Mich	2	Ensign Mfg. Co., Car-Builders, Huntington, W. Va	3
Flint & Pere Marquette R. R. Co., Saginaw, Mich	1	Ohio Falls Car Co., Car-Builders, Jeffersonville, Ind	2	Peninsular Car Works, Car-Builders, Detroit, Mich	2
C., M. & St. Paul R. R. Co., Minneapolis, Minn	2	Barney & Smith Mfg. Co., Car-Builders, Dayton, O	4	Northern Pacific R. R., Brainerd, Minn	2
Memphis & Charleston R. R. Co., Memphis, Tenn	1	Jackson & Sharpe Co., Car-Builders, Wilmington, Del	2	R. & D. R. R., Richmond, Va	2

D. L. WELLS, President. W. B. SHULTE, Vice-President. H. L. NORTON, Sec. and Treas. F. E. WALKER, Engineer

WELLS & FRENCH CO., BRIDGE AND CAR-BUILDERS, CHICAGO, NOV. 13, 1880.

Messrs. Curran & Wolff, City:

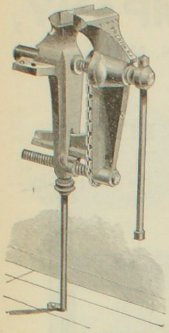
GENTLEMEN: In reply to your favor inquiring as to the two Dry Kilns you built for us two years ago, we take pleasure in saying that they have given us entire satisfaction.

We are drying upward of ten thousand feet of inch boards in each Kiln every twenty-four hours, and the lumber comes out of the Kilns free from checks or damage of any kind resulting from the process.

We have concluded to build another of your Dry Kilns, finding them indispensable in our business, and we do not see how any one doing business requiring a large amount of lumber can get along economically without them.

Yours truly,
THE WELLS & FRENCH CO,
H. L. NORTON, Sec. and Treas.

CURRAN & WOLFF, Proprietors and Builders, 39 and 41 FRANKLIN STREET CHICAGO, ILL.

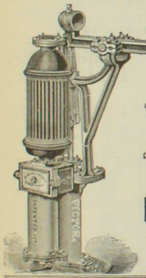


Our NO. 6 VISE opens 10 inches, with 8-inch Jaws; has solid forged screws 1¾-inch diameter, with 26-inch lever. We make 5 smaller sizes of same pattern. Special discounts to R. R. Companies and Car Companies on application.

THE
FISHER DOUBLE-SCREW VISE.
FULLY WARRANTED.
Stronger than any other Leg Vise,
AND ALWAYS PARALLEL.
The Best Vise for R. R. Machine Shops and Car-Builders, and for all heavy work.
Accurate and Durable.
MADE ONLY BY
THE EAGLE ANVIL WORKS,
TRENTON, N. J.

W. BAILEY LANG,
Sole Agent in the United States and Canadas for the
LOWMOOR
IRON COMPANY.
Bar Iron of great strength and uniform quality
Plate Iron unequaled for Fire Boxes.
Tyres, Axles, Chain Rivets, Angle and **T Iron** and **Forgings**
of all descriptions.
STAY-BOLT IRON.
A full assortment of Bar Iron in store.
50 Beekman St., N.Y. **13** Custom House St., Boston

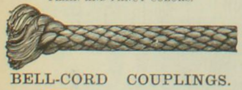
THE JOHN H. McGOWAN COMPANY



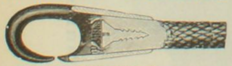
Cincinnati,
OHIO,
Manufacturers of
"VICTOR,"
"McGOWAN"
AND
"Buckeye"
RAILROAD
PUMPS,
IRON PIPE
AND
FITTINGS.

RIVAL STEAM PUMPS.
And BOILER FEEDERS.
John H. McCowan & Co., Cin'ti, O.

SOLID BRAIDED BELL CORD
PLAIN AND FANCY COLORS.



BELL-CORD COUPLINGS.



MANUFACTURED BY
SILVER LAKE CO.
HENRY W. WELLINGTON, Agent, BOSTON

Wrecking and Construction Car.

All the main features, such as leveling car, turn table, self adjustable step for vertical post, twenty feet hoist, working over embankments, swinging load—car body or more—direct on to freight car, hinged jacks, direct grapples to rail, and other important features, all perfected and patented by Jewett, foreman of a wrecking gang for many years.

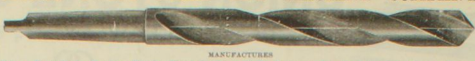
For further information apply to the builder,

HARRISON LORING,
Boston, Mass.

NOTICE.—To build an efficient wrecking car, many of the main features of this car would have to be incorporated into it, which would be an infringement of my patents. Such cars are being built by the undersigned (having special tools for the work) at very reasonable prices, and no charge made for the patent rights, which would have to be paid for by the user if made by an unauthorized person.

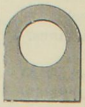
HARRISON LORING.

MORSE TWIST DRILL AND MACHINE COMPANY



MANUFACTURES
Patent Twist Drills, Machine Bits for Wood, Bit Stock Drills, Reamers, Standard Gauges, Milling Cutter and Special Tools, for use in Railroad, Car and Locomotive Shops. **NEW BEDFORD, Mass.**

VULCANIZED FIBRE COMPANY,
SOLE MANUFACTURERS OF



HARD & FLEXIBLE VULCANIZED FIBRE.
Flexible Vulcanized Fibre Dust Guards
and Oil-Box Covers,
being absolutely unaffected by oil or heat, are far more durable and efficient than Leather, and much cheaper.
Office and Works; Wilmington, Del.

OFFICE OF VULCANIZED FIBRE CO.,
MANUFACTURERS OF
HARD AND FLEXIBLE VULCANIZED FIBRE.
Tenth and Walnut Streets, WILMINGTON, Del., April 15, 1884.

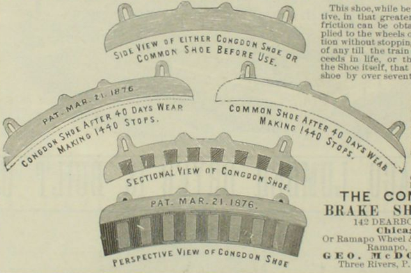
The **Gelatinized Fibre Company,** heretofore manufacturing **Fibre Goods** at Brooklyn, N. Y., has been consolidated with this Company, and hereafter we will manufacture all goods at our works in this city, where all the general business of the Company will be conducted.

It will be our aim to maintain and improve the present high standard of our goods, and the manufacture at one point, under one management, with the best known appliances, will enable us to accomplish this result.

VULCANIZED FIBRE COMPANY.
FRANK TAYLOR, Supt. and Treas. WM. W. SNOW, President.

PINTSCH
MOSCOW, 1872, Great Gold Medal.
VIENNA, 1873, Progress Medal.
ST. PETERSBURG, 875, Gold Medal.
Safety,
Economy,
Brilliancy.
LIGHTING
CINCINNATI, 1881, Gold Medal.
COMPANY,
19 William Street, New York.
H. HOWARD, Pres. F. KUHNE, Treas. W. K. JEWETT, Sec'y.

CONGDON'S IMPROVED CAR BRAKE SHOE.


SIDE VIEW OF EITHER CONGDON SHOE OR COMMON SHOE BEFORE USE.
PAT. MAR. 21. 1876
CONGDON SHOE AFTER 40 DAYS WEAR MAKING 1440 STOPS.
COMMON SHOE AFTER 40 DAYS WEAR MAKING 1440 STOPS.
SECTIONAL VIEW OF CONGDON SHOE.
PAT. MAR. 21. 1876.
PERSPECTIVE VIEW OF CONGDON SHOE

This shoe, while being more effective, in that greater uniformity of friction can be obtained when applied to the wheels of a train in motion without stopping the revolution of any till the train is at rest, exceeds in life, or the durability of the Shoe itself, that of the cast iron shoe by over seventy-five per cent.

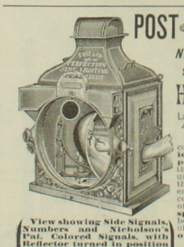
Its durability, together with cheapness and simplicity of construction, recommend it in preference to any other in use.

All communications should be addressed to

THE CONGDON
BRAKE SHOE CO.,
142 DEARBORN ST.,
Chicago,
Or Ramapo Wheel & Foundry Co.,
Ramapo, N. Y.
GEO. McDOUGALL,
Three Rivers, P. Q., Canada.

POST & COMPANY'S

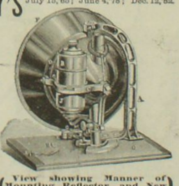
Pat'd Nov. 23, '69; Apr. 29, '73; July 15,'65; June 4,'78; Dec. 12,'82.



(**View showing Side Signals, Numbers and Nicholson's Pat. Colored Signals, with Reflector turned in position for lighting. No more lanterns required on Engines.**)

NEW PERFECTION
SIDE-LIGHTING
HEAD-LIGHT,
Largest AND **BEST** Head-Light MADE.

The New Reservoir is constructed on our **American Student Lamp principle,** which keeps the oil at a **constant level** until **all is consumed,** thereby saving 2 inches of each **wick,** and it overcomes the **unsteadiness** of the flame, caused by **splashing** of the large body of oil in the reservoirs of ordinary **Head-Lights** This reservoir can be **readily taken out to be refilled.** Send for Circular of



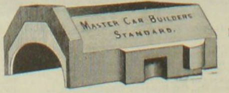
(**View showing Manner of Mounting Reflector, and New Oil Reservoir.**)

REVOLVING AND STATIONARY LIGHTS.

POST & CO.,
Patentees and Manufacturers, *CINCINNATI, OHIO.*

Manganese Bronze and Brass Castings,
STRONGEST AND BEST IN THE MARKET.

FOR
ROLL NECK CAR JOURNAL
AND MACHINERY BEARINGS,

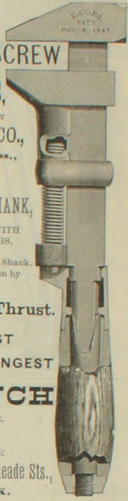

MASTER CAR BUILDERS STANDARD.

ASLO,
Babbitt's Anti-Friction
METAL,
MANUFACTURED BY

JOHN FITZSIMMONS BRASS FOUNDER 23 CARSON ST., PITTSBURGH, PA.

WILSON, WALKER & CO.
(LIMITED),
MANUFACTURERS OF ALL KINDS OF
RAILROAD CAR AND LOCOMOTIVE FORGINGS,
PITTSBURGH, PA.

L. COES'



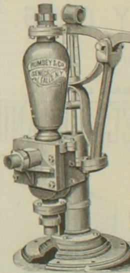
Improved
PATENT SCREW
WRENCHES,
MANUFACTURED BY
L. COES & CO.,
Worcester, Mass.,

ENLARGED
BAR JAW AND SHANK,
FERRULE MADE WITH DOUBLE BEARINGS,
Iron Tube Fitted to Shank, held rigidly in position by handle and nut.

No Back Thrust.
THE HEAVIEST
AND STRONGEST
WRENCH
In the Market.

WAREHOUSE:
97 Chambers & 81 Reade Sts.,
NEW YORK.

DURRIE & McCARTY
SOLE AGENTS.



RUMSEY & CO.
[Limited],
SENECA FALLS
NEW YORK.
Manufacturers of over 800 Different Styles of
PUMPS.
More than 50 railway companies have them in use. Also,
Fire Engines, Etc., Etc.
Ask for Rumsey's Pumps, and address for Catalogue and full information.
RUMSEY & CO.,
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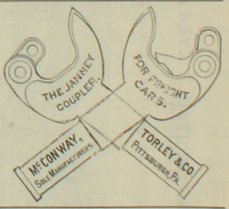
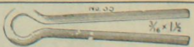
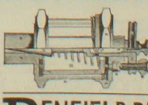

THE JANNEY COUPLER.
FOR FREIGHT CARS.
McCONWAY, SOLE MANUFACTURERS
TORLEY & CO. PITTSBURGH, PA.



COTTERS, SPRING KEYS, BELT HOOKS, D RINGS, STAPLES, ETC.
Manufactured by
BROWNING, SISUM & CO.,
Factory, Brooklyn. 85 Chambers St., N. Y. City.

J. E. LONERGAN & CO.

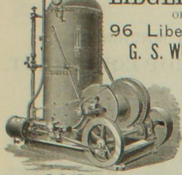


Patent Oilers for Loco. Guides, Rods and Cylinders. Brass Founders and Finishers.
211 Race st.,
Philadelphia.
Catalogue free.

PENFIELD BLOCK CO.
Pulley Blocks and Iron Sheaves.
Phosphor-Bronze Self-Lub. Sheaves
Pushers, Giant Car, $5.00 each.
Poor's Manual, 1880-81 and 82.
See p. 53.
Please write for lists, prices, etc.
LOCKPORT, N. Y.

IMPROVED HOISTING ENGINES,

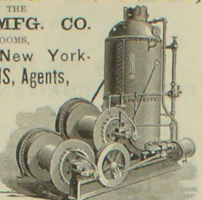
MANUFACTURED BY THE
LIDGERWOOD MFG. CO.
OFFICE AND SALESROOMS,
96 Liberty Street, New York.
G. S. WORMER & SONS, Agents,



Chicago, St. Louis and Detroit.

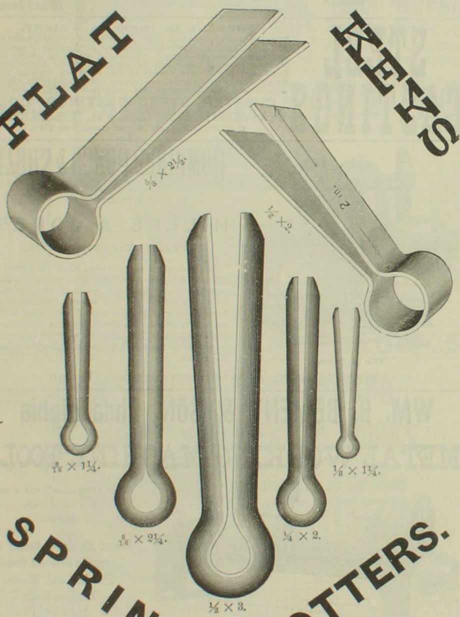
Over 150 different sizes and styles for ALL PURPOSES.

Also
MINING ENGINES,



J. H. HOUGHTON, Eastern Agent, 178 Devonshire Street, Boston

SPRING FLAT KEYS


5/8 × 2½.
2 in.
1/2 × 2.
3/16 × 1¼.
5/16 × 2¼.
1/2 × 3.
1/4 × 2.
1/8 × 1¼.

SPRING COTTERS.

ALL SIZES OF SPRING COTTERS AND FLAT SPRING KEYS

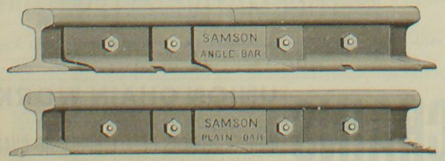
MANUFACTURED BY

The Whitman & Barnes Mfg. Co.,

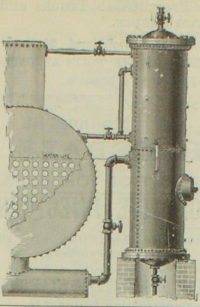
AKRON, O.
ST. CATHARINES, ONT.
SYRACUSE, N. Y.
BOSTON, MASS.

CHICAGO SPLICE BAR MILL.

MORRIS SELLERS & CO., Sole Proprietors and Manufacturers of the Celebrated "SAMSON" BAR



And Every Variety of Plain and Angle Splice Bars.
OFFICE, 6 ASHLAND BLOCK…. …….Mill, Chicago Ave. and the River……….CHICAGO.



STILWELL'S PATENT

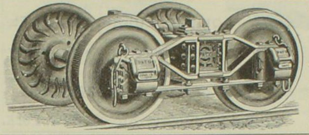
FEED-WATER PURIFIER.

(Patented March 13, 1883.)

Advantages claimed for **STILWELL'S FEED-WATER PURIFIER** over all others:

1. It does purify the feed-water and deliver it to the boiler freed from scale-producing elements and sediment.
2. It supplies the boiler with feed-water of about the same temperature as the water in the boiler, which at 90 lbs. pressure, is about 320°, thus preventing the danger arising from unequal contraction caused by injecting feed-water of a lower temperature than the water in the boiler.
3. It can be used equally well with all kinds of boilers, high or low pressure, and whether a steam engine is used or not.
4. It can be used to advantage following feed-water heaters of any kind.

MANUFACTURED EXCLUSIVELY BY
Stilwell & Bierce Manufacturing Co.,
DAYTON, OHIO.

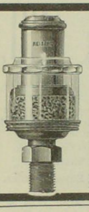


THE THIELSEN TRUCK CO.

142 Dearborn St.,
CHICAGO, ILL.

We respectfully refer you to the following railroads using this Truck:

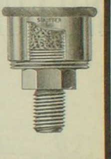
R. & D.; K. C., St. J. & C. B.; M. R., F. S. & G.; C., B. & Q.; C., A. & St. L.; A., T. & S. F.; A. & N.; K. P.; F. & P. M.; M. C.; St. L., I. M. & S.; B. & M. R. (in Neb.); D. P.; L., L. & G.; C. V.; S. C.; Baldwin Locomotive Works.



A. EDW. BARTHEL,

ENGINEER,
111 LIBERTY STREET, NEW YORK. P. O. Box 2837.

SOLE MANUFACTURER OF THE
REISERT, STAUFFER AND BARTHEL



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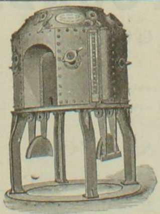

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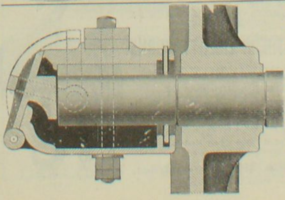

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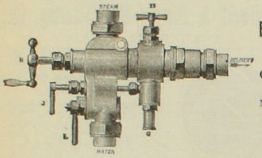

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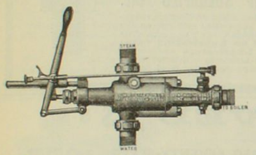

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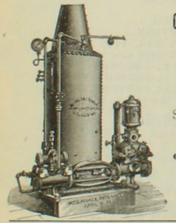

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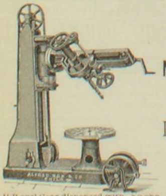

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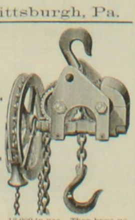

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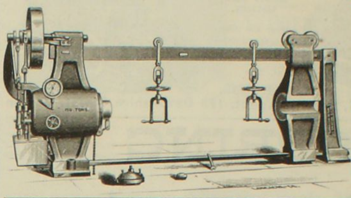

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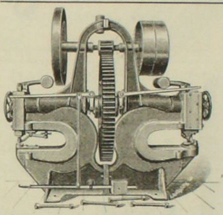

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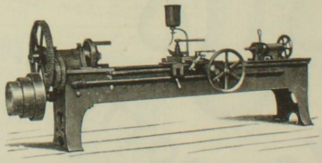

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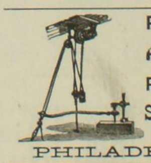

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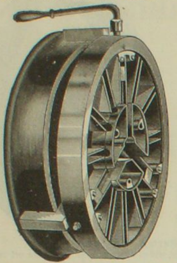

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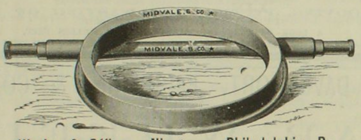

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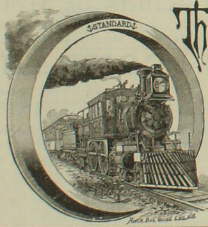

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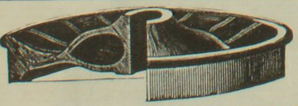

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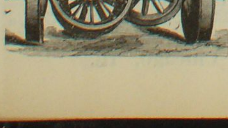

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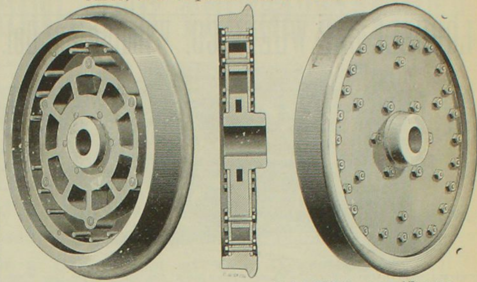

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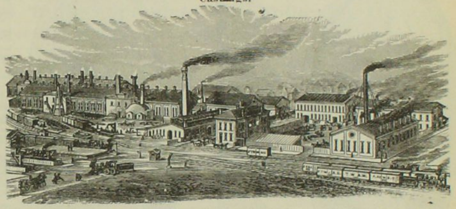

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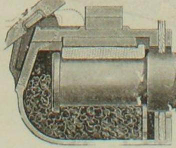

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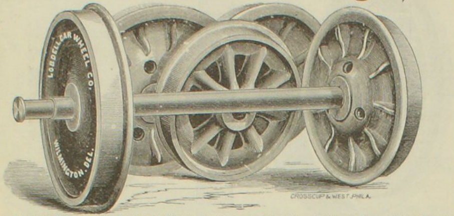
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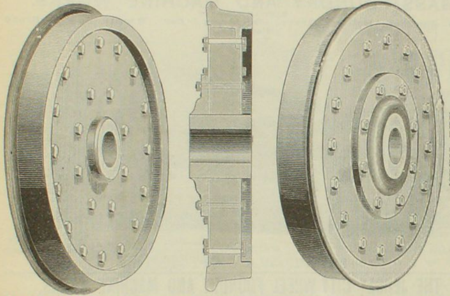

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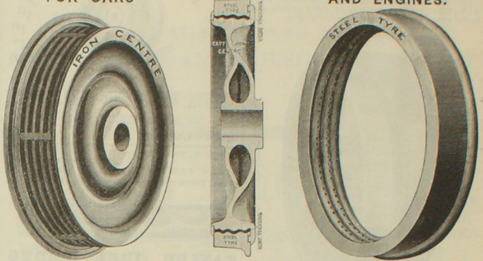

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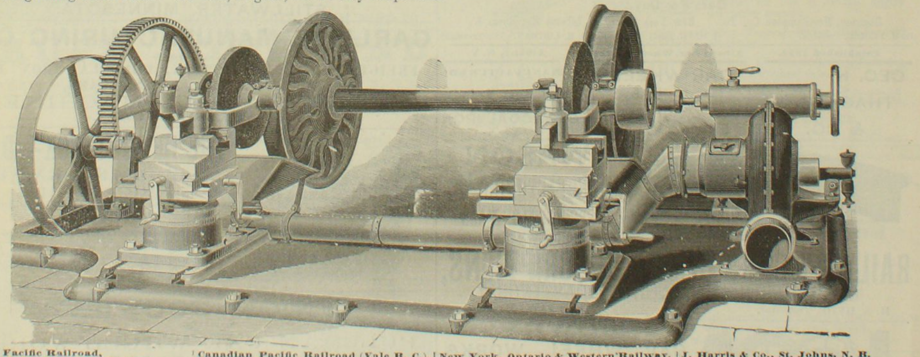

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MANUFACTURED AND SOLD EXCLUSIVELY BY THE

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CHICAGO, Under { Letters Patent No. 285,123. Granted Sept. 18, 1883. Letters Patent No. 287,762. Granted Oct. 30, 1883. } **ILLINOIS.**

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That wheels can not be cast to a true circle, and though registering exactly the same circumference in the rough, invariably differ in size when relieved of their peripheral irregularities.

That if circumferentially matched, rough Cast Wheels are bored and pressed upon their axle, one wheel of the pair being more oval than its fellow, and becoming the smallest of the pair, when both are reduced to a round, the best wearing surface must necessarily be cut from the chilled tread of the other, and best wheel, in order to make it conform in size to its mate.

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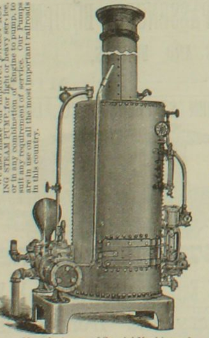

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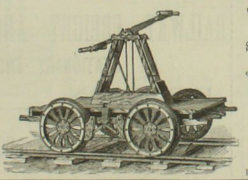

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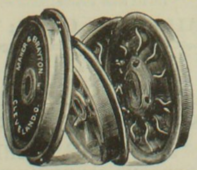

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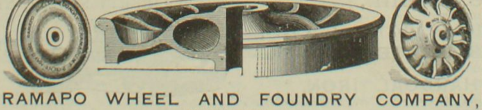

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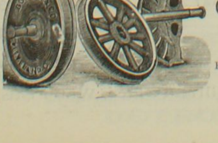

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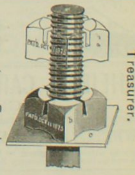

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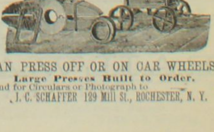

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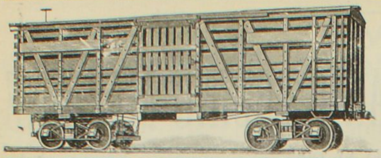

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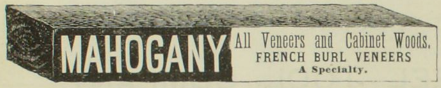
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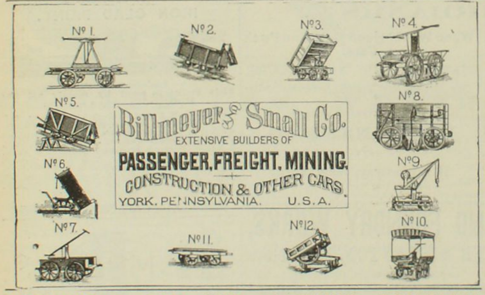

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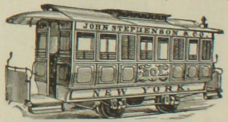

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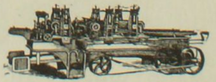

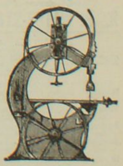

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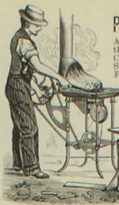

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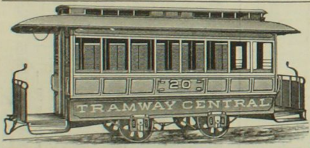

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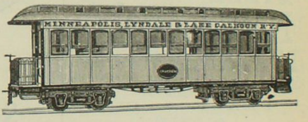
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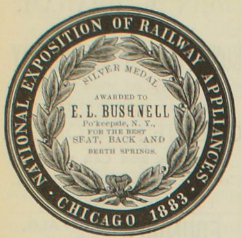

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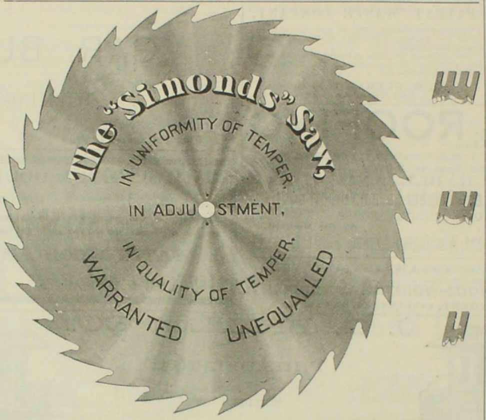
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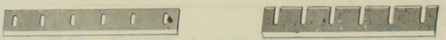

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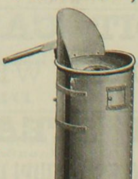

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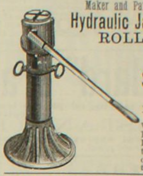

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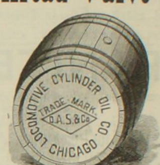
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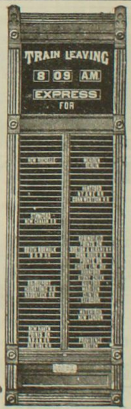

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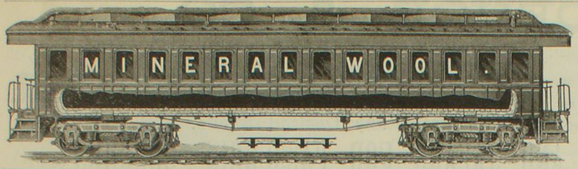
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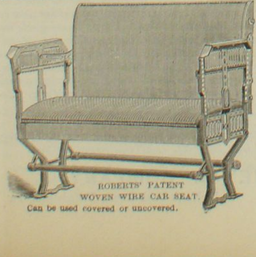

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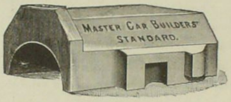
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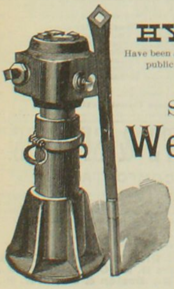

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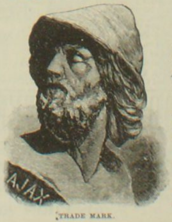

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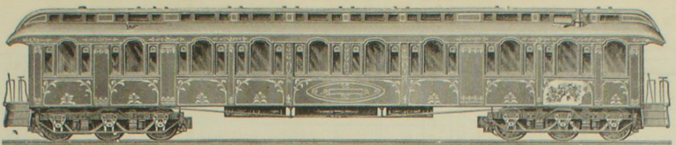


DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XV. NUMBER 5.

MAY, 1884.

SINGLE NUMBERS, TEN CENTS, $1.00 PER ANNUM.

Miscellaneous Items.

MR. WM. M. STRONG, who was for many years Master Mechanic of the New York & Harlem road, died suddenly in New York, March 28.

THE gauge of the Philadelphia & Atlantic City road is to be changed from 3 ft. 6 in. to 4 ft. 9 in. A portion of the work has already been completed.

THE National Paint Works, at Williamsport, Pa., are full of orders from railway companies. Their business during the past year has nearly doubled.

THE Westinghouse Air-Brake Company did a business of nearly $200,000 in March. Orders for their new automatic freight brake are coming in rapidly, about $1,000,000 being already in hand.

GROUND for the new shops of the Delaware, Lackawanna & Western road will be broken at Utica, N. Y., May 1st, and are to cost $500,000 in round numbers. The shops will employ 400 men.

THE Schenectady Locomotive Works have recently received an order for ten locomotives from the Wisconsin Central, for use on the extension of that road from Chippewa Falls to St. Paul.

THE Indianapolis Car Works are building 250 box cars for the Chicago, St. Louis & Western road, and have recently taken a contract to build a large number of cars for another Western road.

MR. J. FOLSOM, who has been for many years Master Mechanic of the Boston, Revere Beach & Lynn Railroad, has resigned and accepted a position with the Eames Vacuum Brake Co., of Watertown, N. Y.

MR. GEO. W. GLASS, Master Mechanic of the Allegheny Valley Railroad, died April 10, aged 64 years. He was formerly an active member of the Master Mechanics' Association, and has been connected with the above-named road ever since it was built.

THE car-works of Murray, Dougal & Co., at Milton, Pa., are filling an order for 100 fruit cars for the Florida Transit & Peninsular road; also for 250 gondola cars for the Beech Creek, Clearfield & Southwestern, and 250 iron coal-hopper cars for the Baltimore & Ohio road.

THE officers of the new England Railway Club, elected at the annual meeting last month, are: President, F. D. Adams; Vice-President, J. W. Marden; Secretary and Treasurer, J. M. Ford; Executive Committee, J. N. Lauder, D. C. Richardson, George Richards.

AN exchange says: "It is a fact which needs no argument that, when prices fall so low as not to pay the cost of an article, the article is sure to deteriorate in quality until its value approximates to its price." If this is so, what is the inference in regard to the quality of $8 chilled iron car wheels?

THE Concord Railroad shops, at Manchester, N. H., have just finished one of the finest and most powerful locomotives ever made in that state, it being designed to handle the heavy summer travel over the road to and from the mountains and other summer resorts. Its weight, ready to run, is 134,800 pounds.—*Railway World.*

MR. ABRAHAM KLOHS, Superintendent and Master Mechanic of the Ogdensburg & Lake Champlain road, informs us that the statement in our last issue that he had resigned is not true. We are glad to make the correction. The statement was copied by us from the *Railroad Gazette*, in which paper it was published upon what was supposed to be good authority.

A PASSENGER car conductor who had been on the road 15 years, and during which time he had been turned over embankments, busted up in tunnels, dumped off bridges, telescoped in collisions, blown off the track by cyclones, run into open switches, etc., says that the safest part of a car is that which happens to be in the shop for repairs at the time of the accident.

THE new shops of the Peninsular Car Co., of Detroit, will cover nearly 23 acres of ground. The buildings will be of brick and will embrace an erecting shop, wood machine shop, brick shop, engine house, boiler house, wheel foundry, blacksmith shop, soft casting foundry, and a number of offices, storehouses, etc. A system of tracks will connect all the shops.

THE Chesapeake & Ohio Railroad have decided to put steamboat whistles on their passenger engines. At present six engines are thus supplied, and soon all of the passenger engines will have them. They will be very convenient both to the public and to the employés of the road, as indicating on the approach of a train whether it is a passenger or a freight train.

THE *Norfolk County Gazette*, Hyde Park, Mass., says: "Under the tender of locomotive 'Daniel Tyler,' of the Boston & Providence Railroad, are four 'Bocham' cast-steel wheels that have run 246,453 miles each wheel. These wheels were imported from Germany and put in use April 7, 1873. They were turned April 12, 1879. The wheels to all appearance will last 11 years longer."

THE Beall Engine, Boiler & Machine Works (Merwin McKaig, proprietor), Cumberland, Md., are running their full force in the building of Mogul horizontal stationary engines, self-lubricating mine car-wheels, keystone roller mills, etc. The mine wheels are said to save a large quantity of oil. One coal company has ordered 500 of them, although they have been on the market but a little more than a year.

TOUCHING the matter of free passes, a newly appointed conductor on the Pennsylvania Railroad submitted to his official superiors the following conundrum: "Suppose a man goes to Pittsburgh on a return pass and dies there. Will his pass be good to bring the body back?" The answer was in the negative, although circumstances might induce the company to waive its rights. This, we should say, is the correct view of the case, unless it can be shown that the *man* is as much a part of the dead body as he is of the live one.

THE wind in Colorado a short time since started a train of eight loaded coal cars from a siding on the Burlington Missouri road, run it on to the main track and from thence to a descending grade, upon which it attained a velocity which carried it 95 miles before it was overtaken by an engine which had been sent after it. A coupling was effected to the rear car, and the train gradually brought to a stand-still after passing eight stations. An alarm was sent along the line from Akron, Col., the place from which the train started, and every thing was side-tracked to give it right of way.

THE first of six gigantic passenger engines under construction at the Vincennes (Ind.) shops of the Ohio & Mississippi Railway has been completed. It is known as the standard passenger engine of the road, and has been built almost entirely from designs of the general master mechanic, Mr. J. H. Setchel. Its total weight is 86,000 pounds, with 56,000 on the driving wheels. The drivers are 68 inches in diameter, cylinders 18 × 24, and the total wheel base 23 feet 3 inches. The six engines and tenders are all equipped with the American Brake Co.'s steam driver and tender brakes, which have been adopted for all the engines of the road.

THE Rogers Locomotive Works are building some locomotives for the Valls, Vallenueva & Barcelona Railway in Spain. These engines are for a narrow-gauge line. Three of them are eight-wheel passenger engines and three are moguls. The moguls have a peculiarity in the way in which they rest on the springs. The weight behind is carried by the four back drivers. Two springs carry the weight, and they are hung in reverse position, one at each side of the fire-box. To the frame is bolted a heavy bracket, which answers as a saddle. The band of the spring pushes on the bottom of this bracket, and hangers at the end of the springs connect with a long equalizer, which extends above the main frame and rests on stirrups placed on top of the driving boxes.

THE Pennsylvania Railroad Company have in course of construction at Altoona, Pa., a palace car for the use of the road, built on an entirely new and original plan, designed by Mr. Bruce Price, the architect. The car is 62 feet long and 9 feet 10 inches wide, or two feet longer and two inches wider than the ordinary palace car. It has convex bay windows, giving a view both before and behind the train, and increasing the ventilation. Internally, it is divided on one side into open compartments formed by sofas placed one against the window and two facing each other. An irregular row of chairs lines the other side of the aisle. The smoking room is hung with tapestry and its furniture upholstered in plush. The ladies' toilet room is in gold and gray, harmonizing with the brass chandeliers and brackets.—*Ex'.*

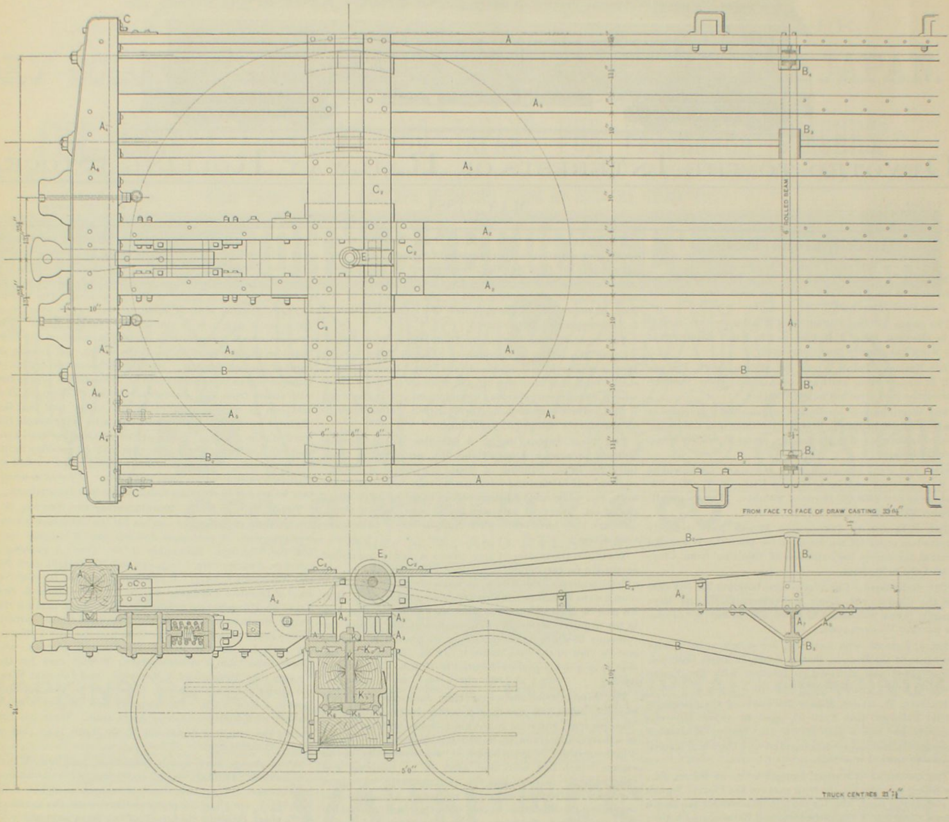
AN electric headlight has been tried on a locomotive of the Pittsburgh, Cincinnati & St. Louis road. The engine has been running with it some 60 days, at an average of 200 miles a day. It is the ordinary carbon light. The dynamo which generates the current is placed on the foot-board on the left-hand side of the boiler, and directly in front of the cab window. A little independent engine of 1½ horse-power is constructed with the dynamo, and is run with steam from the locomotive boiler. The light, it is said, can be seen a distance of ten miles, and that the engineer upon one occasion had seen a tie lying across the track a mile ahead. There are many passably good eyes that can hardly do better than that in broad noonday light. The apparatus, after running some 12,000 miles, needed no repairs, and showed no signs of failing. All that is necessary to keep it in working order is to renew the carbons.

THE Barney & Smith Manufacturing Co., Dayton, O., are building 20 passenger coaches for the Chicago & Northwestern road; 30 passenger coaches and 3 baggage cars for the Chicago, Milwaukee & St. Paul; 5 passenger coaches, 2 parlor cars, 3 baggage and 300 freight cars for the Wisconsin Central; 4 passenger coaches for the St. Paul & Duluth; 2 baggage cars for the St. Louis & San Francisco; 6 passenger coaches and 2 baggage cars for the Fargo Southwestern; 12 sleepers (mahogany outside finish) and 1 parlor car for the Canadian Pacific; 1 officers' car each for the Cincinnati, Hamilton & Dayton, and Cheaspeake, Ohio & Southwestern; 50 fruit cars for the Kansas City, Springfield & Memphis; and 5 elegant Wagner parlor cars for the Shore Line road, to run between Boston & New York. The company now employ a force of 1,200 men, and are working extra time. Their pay roll during the month of March was $9,000 more than that of the previous month.

AN exchange says that a very strong and durable material called "built up wood" is constructed in the following manner: Several thin sheets of veneers, an eighth of an inch thick, are glued one upon another, with the grain of each sheet crossing the grain of the sheet next above or below it at right angles; and, when the whole complex fabric has lost all power of resistance through being almost saturated with steaming glue, it is pressed into an almost homogeneous board without any cleavage whatever, and so without possibility of splitting. Every sort of wood, of course, can be built up. The inside layers can be cheap and the outside choice. No matter whether or not the different sheets naturally swell and shrink evenly together. They are too thin to exert much force. Their separate identities are lost in the common and overmastering union. The advantages of economy, strength in every direction, and immunity from cracking are enough to give the fabric the readiest possible acceptance for whatever uses it may be adapted. It is already in use for broad, flat surfaces in cabinet work, especially where strength or permanence is wanted. It already competes with canvas for the use of artists, and with binders' board for book covers.

SOME of the railway and trade journals have been printing glowing accounts of the new (?) bi-sulphride of carbon motor. A company, it seems, has been organized in a Western town for developing the discovery, and a number of railway men have been induced to take stock in the thing. The idea of supplanting steam with the vapor of bi-sulpluide of carbon is an old one, and has been revived at various intervals during the last 18 years. About 15 years ago the matter was very fully investigated by competent engineers. Experiments were made to determine the amount of power to be obtained, the cost of running the engine independently of the cost of the liquid, and the general saving effected as compared with steam, and it was found that the liquid had some objectionable qualities that were not known when the idea of the new motor was first broached. Certain other disadvantages were also developed, which, from an economical stand point, showed the new machine to be not quite as good as a steam engine. It has also been found by more recent investigations that these conclusions are correct, and that although the substance does boil at a low temperature, it will take just as much coal to produce a given amount of power with the bi-sulphide as with the steam engine.

IRON FRAME STEAM DERRICK CAR.—BUFFALO, NEW YORK & PHILADELPHIA RAILROAD.



Figs. 4 and 5.—Floor Frame, and Section through Truck Bolster and Draw-Bar.

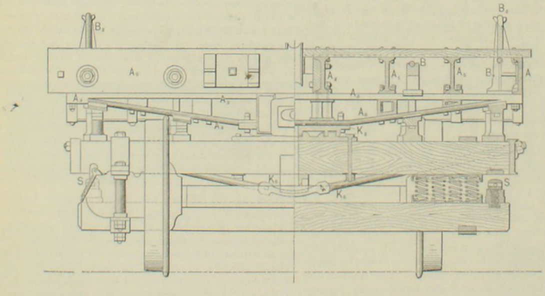


Fig. 6.—End Elevation and Section.

The drawings illustrate the iron frame steam derrick car of the Buffalo, New York & Philadelphia Railroad, designed and constructed by Mr. Allen Vail, the Superintendent of Motive Power and machinery. Its leading peculiarity as compared with other cars of this class consists in the material of the frame, which is iron. With this material, a maximum of strength and rigidity is obtained in the foundation without excess of weight, and at the same time making the attachment of rods and braces to sustain the superstructure, easy and secure.

As will be seen from the perspective view, Fig. 1, page 57, the car is of the gondola pattern, with a crane at one end, and a double-cylinder hoisting engine under the roof of an open cab at the other, the intervening space being occupied by a pair of spare trucks. The floor is composed of I-beams covered with planks 2 inches thick. The outside sills are shown in Figs. 3 and 5. The upper brace-rods are of 1¼, and the lower ones of 1⅛ inch iron. The engine cylinders are 6½ × 7 inch, with rotary valves worked by link motion, and can handle any load that the crane will support. The chain passes over the wheel *E*, Fig. 8, down through the mast to the pully E_3 in the car floor, and from thence to the engine drum. The slack is prevented from falling through the timbers by a piece of No. 6 iron E_4. To provide against emergencies, the crane is fitted with ordinary hand-gear, which is also convenient when the flexible steam connection with the boiler for the supply of the engine is disconnected. Griping devices at the forward or derrick end of the car are provided in case it becomes necessary to fasten it to the track, and screws *S S*, Fig. 6, with capstan heads, take the weight off the springs when the derrick is in use. This much with respect to the general design. The subordinate details have apparently been worked out with equal care, and with a view to effective and economical service.

A plan of the floor frame is shown in Fig. 4. The frame consists of two 8-inch channel beams *AA*, weighing 17¼ pounds per foot, and six 8-inch I-beams weighing 28½ pounds per foot. Two of the latter A_2 A_2 are used as center sills, and carry the draw-gear in the usual way. The end sills are of 8-inch channel bars A_4, which are let into a solid timber A_6, for which they form a backing. The connection of the longitudinal with the end sills can be made in various ways, but the method adopted by Mr. Vail is manifestly the easiest one. Each sill is held in place by a pair of what may be called angle-plates or irons *C C*, in Figs. 4 and 5. These plates are just wide enough to go into the webs inside the flanges, and to which they are held by four rivets in, two rivets each forming the connection to the channel-iron end sill A_4. The strength of this connection is ample for all ordinary work, and its convenience probably more than makes up for the loss of strength as compared with a gusset-plate, which has the disadvantage of breaking up the otherwise flush surface of the frame. The double iron bolsters A_3 A_3 tie the bottoms of the beams together. The straps C_2 C_2 pass across the top of the sills for the same purpose. The needle-beam A_7 is formed of a 6-inch I-beam, and is fastened to each of the sills by two rivets. This beam is held in position by a strap brace A_8. Underneath it the truss end bearing B_3 is placed, and directly over it is a bearing B_4 for the upper

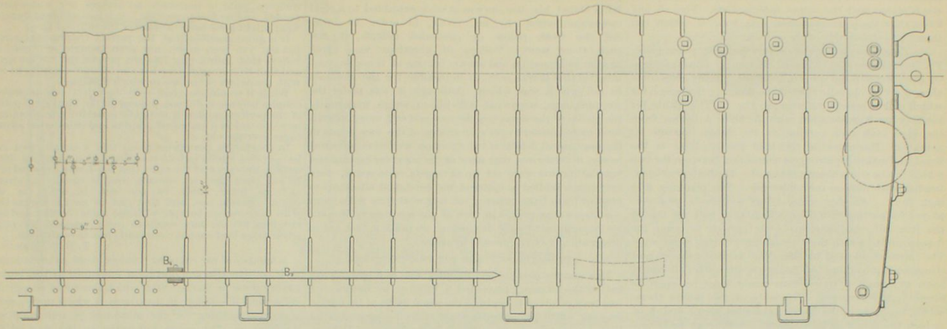


Fig. 2.—Floor.

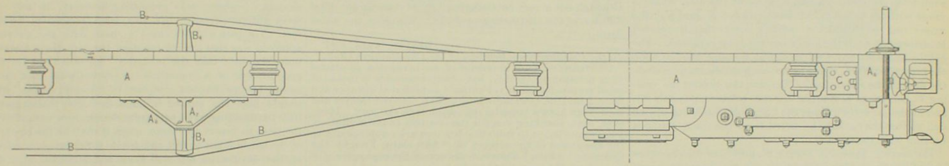

B₇
B₄
A
A
A₂
A₇
B₈
B
B
A₄
C

Fig. 3.—Sill and Brace Rods.

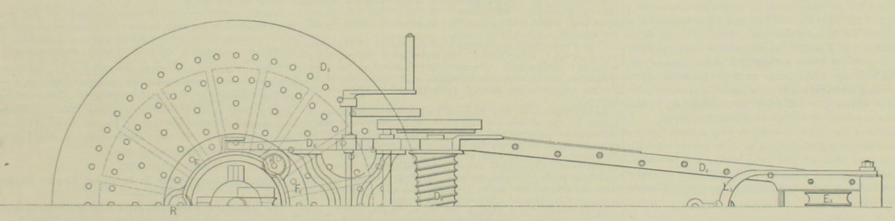
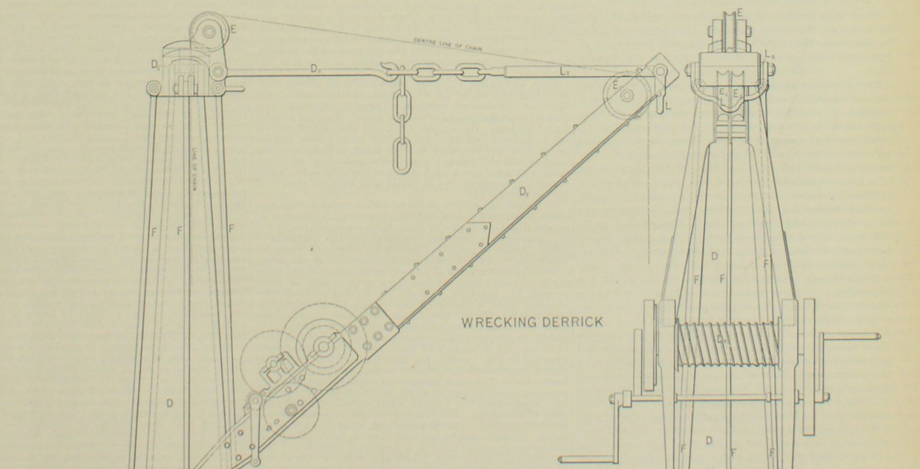

D₅
D₆
D₂
D₇
F₇
R
E₁

Fig. 7.—Half Plan of Cap, Drum and Jib.


E
D₇
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CENTRE LINE OF CHAIN
LINE OF CHAIN
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L
D₁
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D
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F
F
D₄
D
F
F
R
R
F₂
F₂
D₁

WRECKING DERRICK

Fig. 8.—Mast and Jib.

Fig. 9.—Mast and Winding Drum.

truss rod; the rod B_2 is near the side sill, while the under one is placed next the inside intermediate. Figs. 5 and 6 best show the position of these rods, both of which run through to the outside of the end sill.

The flanges of all the sills are punched for ½ inch bolts. The side sills have holes spaced alternately 4 and 5 inches. On the other sills the space is the same, but the holes come alternately on opposite sides of the flanges; the reason for which will be seen by referring to Fig. 2. The planks for the floor are 9 inches wide, with the holes 4 inches from the edge, each hole coming on the flange opposite its neighbor. This gives the best hold for the bolts in the wood, and makes the strongest connection between the two which can be conveniently obtained. The bolts are round-headed, with nuts on the under side. The planking is 1¾ inch thick. Another method has sometimes been employed for putting on a floor, which is to bolt on top of the iron sill, nailing-strips wide enough to cover the flanges, and to which the floor is nailed in the usual way. The method adopted by Mr. Vail is the cheapest and strongest if projecting bolt-heads are allowable. It would seem as though a frame thus made must be equal to almost any emergency. The webs of the beams themselves, as shown in the drawings, are between ⅜ and ¾ of an inch thick, and as they are disposed, seem to be opposing their utmost strength to resist distortion in any direction.

The arrangement of the center-plates and king-bolt are somewhat peculiar. In Fig. 5, K shows the bolt, which is made without a head, but has two keys K_4 and K_5; the upper one is shouldered in such a way that it can not be driven out until the lower one has been removed. The center plates K_2 are well designed, holding the oil upon the bearing surface, while as far as possible, they exclude the dust at the same time. Beneath the bolster the casting K_3 serves as a bearing for the bolster truss-rods K_6, and at the same time holds the king-bolt from being drawn out, so that the car can be lifted from the track without parting with the trucks.

The derrick, shown in Figs. 7, 8 and 9 is of a pattern not very dissimilar to that of the C., C., C. & I. road illustrated in the September CAR-BUILDER, 1883. It consists of a mast or post and a jib D_2 supported by a suspension rod D_3, taking hold of the loop L_2. When hand-power is used, a winding drum D_4 is used for the chain. The cap D_5 is held by four rods F F to the ring F_2, which carries the jib. This ring is held by three rollers R R at the base of the mast. The hoisting chain leads over the pulley E at the top of the mast when power is to be used for operating the crane, but is taken directly from the pulleys E_2 to the winding drum when the derrick is operated by hand.

The weight of the car is 30 tons, its length from face to face of draw-heads is 33 feet 0½ inch. The trucks have 33-inch wheels, and both air and hand-brakes are provided. The car-builder, in examining the cuts, will observe many details to which it is not necessary to make special allusion in the description.

April Meeting of the Car-Builders' Club.

HEATING, LIGHTING, VENTILATING AND COUPLING.

The closing meeting of the season was held at the Club Rooms on the evening of April 17. The subjects for discussion were the Lighting, Heating and Ventilation of Passenger Cars; also Automatic Couplings for Freight Cars.

The attendance at the April meetings is usually rather thin and the interest in the discussions somewhat languid, owing to the nearness of the annual meeting of the Association and the summer vacation. The April meeting this year, however, was an exception. Rarely have the rooms been more densely crowded or the proceedings more interesting and animated, the cause of which was the presence of a large number of inventors and others who had apparently a direct or remote pecuniary interest in the various devices for the warming and ventilating and the coupling and uncoupling of cars. Every foot of available space was occupied with models—of coupling devices more particularly—including every style, from the elaborately finished miniature nickel-plated kind to the heavy working sizes in readiness for practical testing on the cars themselves. In cases where no models were at hand to show the working of the coupling, heating and ventilating arrangements, drawings were exhibited, and all, or nearly all, had a representative present who was familiar with their operation and ready to set forth their merits and peculiarities as soon as his turn came. In accordance with the programme of the meeting, the heating and ventilating men had precedence, and responded with alacrity as each was called upon by the President of the Club to set forth the claims of his invention to the attention of railway men.

We can not undertake to give a verbatim report of what was said, or even a skeleton outline of it. The proceedings, as soon as they were fairly under way, developed the fact that there were rival interests and conflicting views in reference to the best way of getting bad air out of cars and good air into them, and as the discussion proceeded these views became more and more pronounced and irreconcilable. There was a decided lack of unanimity also about the heating; and as the twin subjects of heating and ventilation naturally run together by mutual affinity, the double problem became all the more perplexing and complicated. As soon as the exponent of one method had fairly stated his case, he was at once subjected to a rigid cross-examination by his rivals, in order to bring out the weak points or concealed defects, if any such there were. Volleys of questions were fired at him, and question and answer became at times so commingled that it was next to impossible for the audience to tell which was which. Although it was, under the circumstances, somewhat difficult to weigh impartially the merits of the respective devices, and still more difficult for a mere listener to get a clear idea of the nice points in the mechanical details of construction, we feel constrained to say, nevertheless, that none of the plans for heating and ventilating that were set up as targets, so to speak, were very much riddled or battered, not enough at all events to prevent them from entering the lists next time with more confidence than ever. In view of the contrariety of opinion brought out by the discussion, we think it best not to designate any of the devices by name.

AUTOMATIC COUPLERS FOR FREIGHT CARS.

This was the next subject in order, and as a preliminary matter the secretary presented a number of letters that had been received in reply to the usual cards of invitation sent out soliciting attendance at the meeting. Among these letters was one from Mr. T. B. Buchanan, of Denver, Col., which was read to the Club and listened to with close attention. It is a practical and lively presentation of the subject of car-couplers at its present stage of progress, although not a very encouraging one as regards the final solution of this distracting problem. We give the letter entire:

DENVER, April, 1884.

To the President and Members of the Car-Builders Club:

GENTLEMEN: I am in receipt of an invitation to attend your meeting of April 17, but as improvements in means of rapid transit have not yet entirely annihilated distance and time, I find the 2,000 miles intervening between Denver and New York City a considerable obstacle in the way. However, first, thanking you for the courtesy of the invitation, I have concluded to submit a few remarks appropriate to the discussion of the subject of "Automatic Freight Car Couplers," which I observe to be one of the topics for discussion on the evening named.

The chief attorney of the Union Pacific Railway recently remarked to me, that the present mode of coupling freight cars was simply "barbarous," and said he, "there are more men killed and maimed by it annually, than by all the wars throughout the world."

This was perhaps an exaggerated statement of the case, but it serves to show how keenly the need of an improved method is recognized. The same sentiment has been expressed to me by railroad managers and operators of all grades of authority, though perhaps not in such strong terms.

In the reports of the various railroad commissions in many of the states for the year 1882, every one takes occasion to make special mention of the great number of cases of death or injury to brakemen in coupling and uncoupling cars; and one of the most intelligent and exhaustive of such reports contains the statement that the risks and injury to brakemen in coupling and uncoupling cars are greater and more frequent than to employés in any other legitimate business in the country.

The records of the Patent Office, at Washington, disclose the fact that more than 3,000 patents have been issued upon devices for coupling cars. It is perhaps reasonable to estimate that these 3,000 patents represent about 2,000 separate and distinct devices.

These facts and circumstances, taken in connection with our individual experiences and observation, establish the fact of a crying need for a better mode of coupling cars than that in common use. This want is so urgent, that, not only do railroad men and railroad employés recognize it, but the intelligent public and the press of the country have come to recognize it and demand a reform in this particular.

Thus, and in this way only, can we account for the wild-eyed bore who turns up every week of the year at the office of the master car-builder, master mechanic and general superintendent, with the model of a car-coupler under his arm. He may be a bore of the largest caliber, but he nevertheless has an excuse for his existence and his pestiferous perseverance in this want, which has long existed and still exists; and the annual crop of "car-coupler cranks" is not likely to grow less until some better method of coupling cars is found and adopted than that now in general use.

As before stated, this problem seems to have been specially considered by about 2,000 inventors, and there is no reason that I know of why these 2,000 inventors might not be supposed to possess the average talent and ingenuity of a like number of inventors generally. Some of these inventors have perhaps but a slight conception of the many essential requirements of a successful and durable automatic coupler; but, at the same time, many of these persons are practical railroad men and railroad mechanics, with a thorough knowledge of all these requirements. Now, query. Is there not among these 2,000 devices for coupling, one with merit sufficient to justify its adoption and use until a better has been found? Does the fact of the lack of some real or imaginary non-essential feature justify the rejection of any particular device that may be conceded to be the best yet produced? I am aware that some master car-builders, and they are men too, accomplished in all the technicalities of the craft, have formulated the various requirements of their *beau ideal* of a coupler. They have described in detail what it should be, what it should have, and what it should not have. No such coupler has ever been devised. They will not themselves say that it is a *practical* possibility; but, nevertheless, they refuse to look at a coupler unless it is guaranteed to possess all these imaginary good points. If this rule had been applied and inflexibly adhered to in the infancy of mechanical invention, there would now be no plow but the crooked stick, no vehicle but the ancient one with a solid wooden wheel, and no tool in all the arts better than the flint hatchets of the savages of prehistoric times.

If the men who furnished the means of building the first railroad had said to the suggestors or promoters, "No; we will not bother with so imperfect and expensive a means for transportation, our ideal is *air navigation*, where there is free right of way and no track to build or maintain, no bridges nor water-tanks needed, and no fuel to provide," it is impossible to imagine what might have been the fate of the railroad idea.

It is quite possible that the perfect freight-car coupler has not yet been made, nor even thought of; but I do believe that railroading has got beyond the "stone age," and that the common drawbar and bumper ought to be left with the débris of the age to which it belongs.

While it would be great folly to reject any improved coupler because it did not possess all the ideal good points of the perfect coupler, it would be equal folly to adopt any new one unless it embraced positive and substantial advantages over the old.

In conclusion, permit me to say that a coupler that can be operated *wholly* in both coupling and uncoupling, from outside the cars and the rails, that has fewer loose parts to be lost than that in common use, is equally as strong and as little liable to get out of order, as the one in common use, and that can be used in connection with the common bumper with the same facility and less risk than two old ones, seems to me to possess substantial advantages that should command close investigation.

T. B. BUCHANAN.

A number of car coupling models were exhibited, and their construction and operation explained by the parties having them in charge; after which there was a long conversational discussion, in the course of which the necessity of doing something for the protection of train-men was dwelt upon. The many difficulties in the way of the adoption of any uniform and satisfactory method were also enumerated, and various suggestions made as to the best and most practical mode of dealing with the subject. Nothing was proposed, however, in any respect different from what has been suggested heretofore. The plan which seemed to meet with the greatest approval was that the car-builders, through their Association, should "take the initiative" by providing for the appointment of a committee or commission, not from among themselves, but composed of "scientific men," who should take the matter in hand, and after taking ample time for deciding what particular devices now extant were the best, to report the same, when it shall be the business of the car-builders to test and decide for themselves which of the devices as reported they will approve, with the understanding that their action will be indorsed by the general managers.

A very encouraging statement was made by Mr. Garey, the President of the club, to the effect that the five coupling devices recommended for trial by a committee of the Car-Builders' Association at the Niagara Falls meeting, in October, 1882, had all been in use and had proved more or less satisfactory, and that more progress had been made during the last ten months toward getting an automatic coupler than in all the previous years; and furthermore, that within the next ten months he was satisfied that some sort of coupler of this description would be decided upon that would come into general use.

Building Locomotives in Railroad Repair Shops.

The *American Machinist*, after setting forth the reasons why better and cheaper locomotives can be built by the regular manufacturers than the road companies can build in their repair shops, says:

"Considering the manifold benefits thus obtained from the support of good locomotive building establishments, it might be expected that railroad companies would hesitate about seceding from a practice which has worked so well all round; yet there is a growing tendency among master mechanics to abandon contract shops and construct their own engines. We think this is an expensive mistake. It is certain that no railroad shop in the country can build locomotives as cheaply as they can be bought from our best makers. Very few railroad shops possess the means of telling how much new work costs them. Where the repairing of old work and the production of new are mixed up as they are in nearly all repair shops that aspire to build new engines, keeping the items of expense apart is an extremely difficult matter; but where this has been done in a systematic form, undoubted proofs are furnished that few railroads can afford to build their own engines. When railroad companies having the excellent facilities possessed by the Pennsylvania and the Philadelphia & Reading Railroads find it cheaper to buy locomotives than to build them, companies less advantageously equipped should take pains to count the cost before they indulge in the expensive luxury of building their own locomotives.

"Sometimes a master mechanic embarks in locomotive building because he has certain ideas of his own which he wishes to incorporate upon his locomotives. This individuality in mechanical construction has done so much towards perfecting the American locomotive that it deserves every encouragement, but master mechanics need not desert the regular locomotive builders because they have got original ideas which they wish to put in structural form. By transferring their designs to paper, locomotives with every feature formed to suit the taste of the purchaser can be obtained from contract shops. We recently saw a group of seven locomotives whose design departed radically from the ordinarily accepted forms, yet they were built to exact templets which were at the service of the purchaser. The saving of expense effected by the use of the standard sizes, when an engine comes to be repaired, is an item worthy of consideration; and where engines are scarce substantial repairs can be effected in an incredibly short time by the interchangeable process.

"Locomotive builders following the business on a large systematic scale enjoy all the advantages possessed by the wholesale manufacturer over the mere maker who fits each piece to suit a single machine. They hold a position, in regard to ordinary railroad shops engaged in locomotive building, similar to what a sewing machine company does in relation to the owner of an ordinary machine shop who engages to build ten or twenty sewing machines. The system, the subdivision of labor and the special machinery of the works devoted to a particular line, enable them to far undersell those who do not follow the

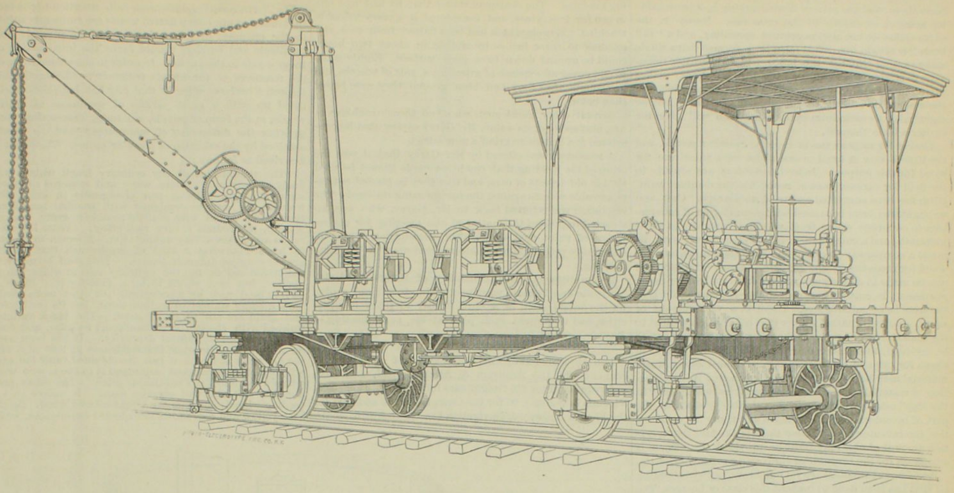


FIG. 1.—IRON FRAME STEAM DERRICK CAR—BUFFALO, NEW YORK & PHILADELPHIA RAILROAD *(See Pages 54 and 55).*

business regularly. Machinists and other mechanics in regular locomotive works are engaged day after day for years on the same kind of work, and they become proficient in their line beyond anything a man doing similar work at intervals can hope to attain. Moulders long engaged continually upon recurring work very rarely have failures, even with the most complex castings, and every department in the work gains savings in a similar way. The aggregate of these savings and cheapenings of production make up a long bill, which must be added to the expense of locomotives built in shops not devoted to the business. If master mechanics would give these considerations their attention, they would soon reach the conclusion that building locomotives in railroad shops is no more remunerative than the building of lathes in the same place."

The Car Inspector.

The car inspector's position is an humble but important one. The railroads are more appreciative of his duties than in years gone by, and the best-managed roads are as careful in their appointment of car inspectors as in the selection of train dispatchers. If either makes a mistake it is irreparable and fatal. A drunken or incompetent dispatcher might cause two trains to crash into each other with frightful loss of life and property; a car inspector, through negligence or unfitness, might suffer a broken wheel or a disordered brake to pass unnoticed until a car broke down wrecked or a train plunged into a broken bridge, because the brake would not work. So much machinery and apparatus is in use on a passenger coach that an inspector, to be competent, must be an intelligent mechanic. He must know the effect of heat and cold upon metal, and must comprehend the effect of contraction and expansion; he must be a wood and iron worker, he must understand the properties of steam and compressed air; must be acquainted with the mechanism of automatic steam and air brakes, and be able to adjust them if faulty; he must know what a hot box or flat wheel is, and the remedy; he must be able to detect a loose wheel—one that revolves on the axle instead of with it; his ear must be so attuned that he will know by the sound when he strikes a wheel whether it be cracked or broken or whole; he must know how far the running gear may be defective and yet be temporarily safe; he must be quick in forming judgment, alert of muscle and Argus-eyed, and primarily, he must know all about a car from the flange to the roof ventilators. Their negative qualifications are almost as important. He must not be afraid of oil or smut; he must dive in among the wheels and springs and brake rods, and lie at length, perhaps on his back, on the track, where a single wave of a brakeman's lantern might bring destruction upon him.

Numerically considered, the importance of the car inspector asserts itself. There are over 100 inspectors in this city, and every station where change of cars is made or where shops are located has its army of them. There are day and night inspectors for freight and passenger cars. No through passenger train touches this city, day or night, that does not undergo inspection, and the tinker of inspectors, the hammer and flare of their flambeau and the hiss of the air or steam as they try the brake, have been observed a thousand times by every traveler. To the thinking passenger the noise and the light are not nuisances, but the evidence of careful management and security. Every day these guardians find something wrong with a car—some defect, which means danger. Recently every train which passed over a certain section of an Indianapolis line received one or more broken wheels. The inspectors discovered the breaks, and finding them repeated and always on the same side of the track, concluded that a rail or frog somewhere was defective. After a protracted search, a frog half out of position, and calculated to do infinite mischief, was discovered. The front cars, generally the postal or baggage car, are most frequently disabled. This is because they are lighter built and are the first after the engine to encounter and perhaps remove obstructions on the track.

"Our lot is not particularly happy," said a chief of a gang of inspectors who had patiently waited four hours for a delayed express, "but it is just as necessary that that train be overhauled when she gets in as that she have a conductor or engineer; and as our duties are indispensable, we feel about as important as the brass-buttoned brakeman or the diamond-studded chair car conductor."—*Indianapolis News.*

Railway Gardening.

The traveler in England finds that the railroad stations, however small, are in marked contrast with similar stations in this country. Instead of the usually desolate appearance, often increased by accumulations of old ties and other railroad rubbish, seen at home, the grounds surrounding the station house are laid out and kept with all the care given to a private garden. So excellent an example has extended to this country, and one of the railroads running south from Philadelphia has for some years employed an experienced gardener to superintend the planting and care of the grounds around its numerous depots.

It would be vastly better for each road to employ a competent person to lay out and plant the grounds around its stations than to leave this to the fancy of the station-masters. So far as we have observed, when the plantings are thus left, efforts are directed entirely to immediate effect. Areas are devoted to the usual bedding plants, but no provision is made for the future. A competent superintendent, while he would not neglect the bedding plants, would set out ornamental trees, flowering shrubs and hardy perennial plants. With these the surroundings of the stations would increase in beauty from year to year, and with a proper selection of hardy perennials the need of an annual renewal of bedding-plants becomes thereby greatly reduced.

Another matter much regarded in Europe, but little considered in this country, where it is much more necessary, is the planting of climbers around station buildings. The passing traveler has but a few minutes, at most, to notice such improvements, and nothing is more striking than to see the buildings draped with climbing vines. Besides beautifying the surroundings of the stations, in some parts of France and Germany the sides of the railway embankments have been turned to account by devoting them to the cultivation of fruit-trees of various kinds. The embankments on some of the roads in this country present a large area, which in time will produce something —usually a crop of weeds. If the embankments are not uited to fruit culture they may generally be made useful by sowing them to grass, which, besides keeping down the weeds, would render good service in binding the soil and preventing sudden "wash-outs." Some years ago the traveler over one of our Middle State roads must have noticed the vegetable patches attached to the cabins of the road tenders. These were often examples of excellent culture, and served to show how the wasted land along the roads might be utilized. Land will not always be so cheap in this country as it is at present, and our railroad companies will find it to their interest to utilize a vast area that now goes entirely to waste, by planting trees and shrubs.—*American Agriculturist.*

Suggestions for Inventors.

There are many inventive minds that are comparatively idle for the reason that the wants of the people are not thoroughly understood. In order that inventors may get an idea of what is needed in the way of improvements, and that would be tolerably certain to bring a reasonable reward to the inventor, a brief mention will be made of a few needed improvements in railway appliances.

The numerous and frequent accidents and delays to railway trains on account of snow, point to the fact that better applainces for removing snow and ice are needed, and now is the time for observation and experiment. The man who will bring out an improved snow-plow and flange-clearer will be well paid for his labor.

Accidents from broken parallel rods are becoming more frequent than formerly, and an improved construction of that overworked and abused part of a locomotive is called for. But in order to be successful in designing an improved parallel rod it is necessary to study the nature of the various strains, jars, shocks and vibrations—lateral, centrifugal and otherwise—to which the rod is subjected. Owing to the peculiar duties the rod has to perform, it is desirable that its strength be increased as much as possible without a corresponding increase in weight.

Notwithstanding the fact that our railway lines have adopted the most approved signal appliances for the safe running of trains, collisions are yet too frequent, and something reliable in this line is needed. Some of the systems now in use are reliable when in good order, but their liability to derangement renders them dangerous, and there is room for improvements in this direction. Many disastrous collisions are caused by defective draw-tackle. Pins and links break and draw-bars pull out, and trains breaking in two is a fruitful source of disaster. Better fastenings for draw-bars, and links made of wire cable by some process yet to be discovered, would yield a fortune to the inventor. It would not seem to be a difficult matter to make a machine that would convert wire into links by a winding and welding process—that is, make a wire link. The nut-lock men have not yet succeeded in producing a perfect lock. There are those that will give satisfaction in certain places, as in agricultural machinery, carriages, etc., but no satisfactory lock has yet been devised for track fixtures. As the safety of railway travel depends largely on the condition of the rail joints, a more efficient nut-lock is among the wants of railway officers.

A great many serious railway disasters have resulted from the spreading of rails. On roads of heavy traffic the ordinary spikes are inadequate to resist the strain imposed upon them, and the plan of double spiking is objectionable on account of injury to the cross-ties. Moreover, the extra spikes do not always prevent spreading, and a "rail brace" is sought for. This must be so formed that a single spike passing through the brace will give greater resistance to strains than two, or even three, ordinary spikes driven in the ordinary way. This is not impossible, and the manner in which it may be accomplished may not be regarded as a conundrum by any one who will give the matter a little thought.

Timber for railway ties is rapidly growing scarce, and the time is now at hand to cast about for a substitute for wood for this purpose. Indeed, inventors are already in the field for various plans of relief for the coming want. Glass has been suggested and tried in Europe. Cast and wrought iron have been used with some degree of satisfaction in countries where frost was not injurious to those materials, and a combination of wood and iron may be made a comparatively cheap and desirable substitute for wood for cross-ties in any climate. Straw and sawdust can be made to do duty as wood cut from the tree for many purposes. In cutting ties from timber it is necessary that the trees be of suitable size. There is a vast amount of small, crooked, gnarled timber that is entirely unsuited to the manufacture of ties. Perhaps, by some process yet to be invented, this timber may be utilized and brought in shape for ties and other purposes. Perhaps other waste material may be utilized for this purpose. A combination of materials that are now regarded as waste or "in the way" may, perhaps, be made valuable by study on the part of inventors. In producing a substitute for wood for ties the inventor must not lose sight of the fact that a certain amount of elasticity must be provided for. There is a bonanza for the inventor of the coming railway cross-tie.

Accidents at crossings are yet numerous, notwithstanding all that has been done to prevent this class of horrors. The proper place for an alarm is at the crossing, and it must be so located that it will be sure to warn people in time for them to avoid collision. There are some automatic alarms in use, but, like other automatic appliances, they are susceptible of improvement. In short, there is hardly any safety railway appliance but may be improved, and inventors who are seeking for profitable fields of labor will do well to investigate the causes of railway accidents and devise means of greater safety to life, limb and property.

The foregoing will indicate the direction in which inventors may work with profit, and although the ground in the main has been worked over, there is yet room for valuable improvements. With many inventors it is as difficult to know what to invent as it is to perfect the device when once in hand. "What shall I invent?" is a question often asked by prolific inventors who are equal to any task set for them, but who are at a loss for ideas to start them in the right direction.—*Scientific American.*

Car-Builders' Meeting at Buffalo.

An adjourned meeting was held April 15, at which the following resolution, offered by Mr. Garey, was discussed:

Resolved, That it is the sense of this meeting that all bearing springs under freight cars when failing under fair usage shall be replaced at the expense of the owner; and all draw or buffer springs that are broken or set, or show a permanent set one inch or more from the original position, shall be removed and others replaced at the expense of the owner.

Mr. J. D. McIlwain asked whether the spring should be replaced by one of the same make.

The temporary chairman, Mr. F. M. Wilder, replied in the affirmative.

Mr. Garey explained that he considered a failing spring to be one broken, dead or nearly set.

Considerable discussion was had on what should be considered as fair usage, several holding that the springs of a car should be capable of bearing double the stencil weight. Mr. Wilder said that he did not consider a spring which did not yield more than three-fourths of an inch under a loaded car to be a good one. Finally the first part of the resolution was adopted and the second failed to carry.

On motion of Mr. Adams it was resolved that it was the sense of the meeting that all railroad companies should adopt buffer springs for freight cars of a capacity of not less than 18,000 pounds.

Mr. Lentz brought up the question of the proper method of calling the attention of the railroads to the matter of replacing car wheels and axles of foreign cars with those of a different pattern than were used on the road which owned the cars. This subject also included the question of how to protect themselves. A discussion followed, showing the requirements of the different roads and their practice in replacing car wheels and axles, and it was suggested that if all abided by the rules of the association this difficulty would be obviated. In answer to this suggestion it was stated that the trouble was mainly occasioned by those roads which sent no representatives to the meeting to join in the discussions.

Mr. McIlwain moved that it was the sense of the meeting that all wheels removed by one company from cars belonging to another company should be reported to that company; in other words, a blank bill should be sent.

Mr. Garey moved that a charge of fifty cents should be made on all such wheels not otherwise chargeable. His object was to make it an object for the forwarding of such reports. The amendment was voted down and the resolution adopted.

Mr. Miller inquired as to the value of the wheel-grinding machine. The chairman stated that he had had one in use for two years, and considered it a very valuable machine. Wheels which had been flatted from two and one-half to three inches by sliding, in about two hours could be ground down to a good surface. Eighty cents would cover all expense of grinding a pair of wheels, and he thought after they had been ground they were better than before.

Several other gentlemen, who had those machines in use, also spoke of its value, Mr. Garey saying that he considered it a benefit to grind a new wheel.

A resolution was offered by Mr. Garey that it was the sense of the meeting that condition cards should be used stating old defects of cars, and that they be classed as non-chargeable defects against the parties using the cards. The resolution was referred back to Mr. Garey, who was instructed to present the matter at the meeting for the revision of rules next June. The secretary was also instructed to present all the matters acted upon at the same meeting.

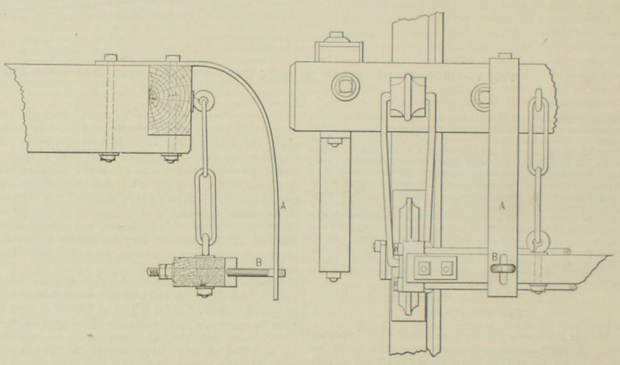
A committee of three, consisting of Messrs. Frederick McIlwain and Robson, was appointed to formulate a plan for the organization of a club similar to those in other cities, and to present such plan at the next meeting.—*Buffalo Express.*

THE Anniston (Ala.) Car Co., have just completed 25 coal cars for the Anniston & Atlantic road, and have orders in hand for 200 freight cars for the East Tennessee, Virginia & Georgia, 90 for the Georgia Pacific and 100 for the Florida Railway & Navigation Co.

Native Hardwoods for Finish.

The *Northwestern Lumberman* calls attention to the fact that many of our cheap native woods are eminently suited to the purposes of house decoration, and suggests that architects and builders should favor the introduction of these woods to the public. In order to show something of the resources of the forests tributary to Chicago in this respect, a business office in that city has been elaborately fitted up with a great variety of specimens of native woods, in the form of panels, moldings, wainscoting, etc., showing the differences of manufacture and the effects obtained by the selection of peculiar grains. The result is described as follows:

"The possibilities of our ordinary black walnut are finely brought out. Plain, wavy and blistered surfaces, some of them shining and changeable in color like watered silk, can be combined with peculiar markings, that can be found with a little trouble in every load of walnut, to produce a very rich effect. What is called calico ash makes a very unique trim. It seems to be got by bastard sawing a kind of brashy ash that has its growth-rings of different shades. This stuff by many is not considered fit for the ordinary uses to which ash is applied, but here seems to be a field for it. Birch is largely used now as a substitute for other more costly woods, being stained to imitate them; but its own color and grain are not to be despised. The black variety, finished with shellac, is as handsome as gum, and does not show so much natural depravity. It has been used on a large scale in some fine residences in this city, and the low price at which it can be obtained, and the ease with which it is worked commend it to those who wish a hardwood finish at a reasonable price. The effect produced by soft elm will surprise many. It makes an exceedingly handsome trim for a light colored wood. Beech, both yellow and red, shows unexpected excellences, while the despised yellow poplar gives a bright and rich surface that commends it for use in combination with dark materials. But of all the list sycamore is the most remarkable. The sycamore of the Wabash produces a finishing lumber as handsome as choice cherry, red cedar, or even rosewood. It has a rich, reddish brown color, with a peculiar mottled appearance, interspersed with the delicate lines of the grains, as if the fibres were interwoven, like the fibres of the palmetto. Cottonwood, treated with white shellac, rivals the brilliant surface of white maple. Gray or soft elm has one peculiarity that we fancy is not generally known. Its grain is very similar to that of San Domingo mahogany, and with a proper transparent stain can be made to imitate it so closely that it would require an expert to distinguish the real mahogany from the false. A commercial building in Chicago has its mahogany counters made of this wood, and it is safe to say that none but the owners and the men who put them in know that they are not the genuine article. To this list may be added the ordinary scrub oak, as it is found on the prairies of Illinois and Iowa. Its gnarly character shows to great advantage when smoothly dressed, and nothing but its common and despised appearance when standing prevents its coming into high repute as a finishing wood. When looking around for cheap woods yellow pine should not be overlooked. Every one of these woods is available for finishing, all directly tributary to Chicago, and can, with the exception of walnut and cherry uppers, be furnished for less than $50 per thousand feet. Some of the finest come at but little more than $20, and there would seem to be no reason why any one should be deterred from using a hardwood finish because of its cost; certainly not from the cost of the wood itself."

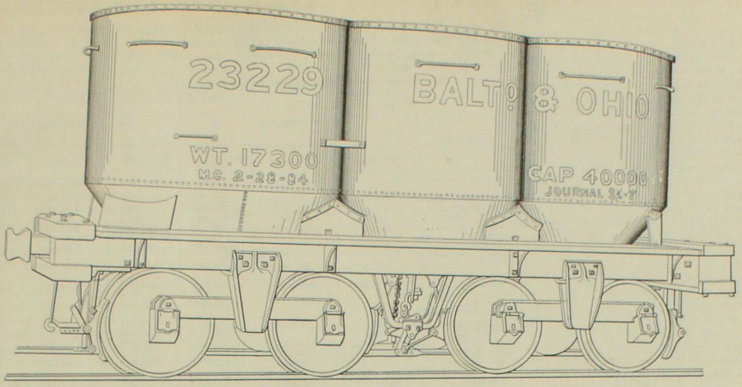


IMPROVED METHOD OF APPLYING BRAKE SPRINGS.

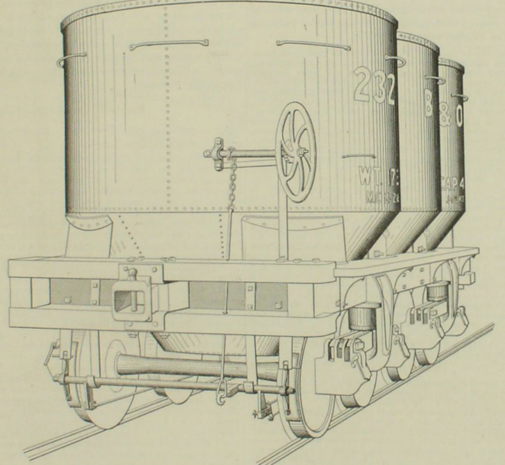
The cuts illustrate a method of applying brake springs on the passenger cars of the Great Western Division of the Grand Trunk Railway. The device consists of the spring *A*, which is made of one plate of steel, and an adjusting bolt *B*. The spring is set with three inches less set than is shown in the cut, where it is represented under its proper strain. It is fastened to the axle-guard timber and end-rail of the truck with two ⅝-inch bolts. The adjusting bolt *B* has a ¾-inch T-head, which passes through an oblong hole 3 × ¾ inch. The bolt is squared under the head to prevent turning in the spring. Jam or double nuts are used in order to hold the bolt more securely in place.

The advantages of this arrangement are several. 1. The spring is easily formed, has no short bends or kinks, and hence is not liable to break. 2. If one spring happens to be weaker than its mate, as is often the case, it is easily adjusted by slackening or tightening the bolt *B*. 3. Every time the brake is applied the bolt moves in the oblong hole in spring, and back again to its former position when the brake is released, thus holding the brake shoe clear of the wheel and preventing the top or lower end of the shoe from being in continual contact with the wheel—a pest with which all car-builders are familiar. Or, as is the case with the Hodge system, namely, at the outside end of truck the top end of shoe rubs the wheel, and on the inside end the bottom end of shoe does the same. The plan in use by the Pullman Co. is very good so far as keeping the shoe parallel to the tread of wheel is concerned, but it does not equalize the distance between the shoes and wheels, which the plan herewith shown does do, and which is cheaper in the material used, and also in its construction and operation, besides being a saving in power, as it prevents any retardation by the shoes not hanging properly, and which amounts to considerable in a train of eight or ten cars with two or four brake shoes on each car clinging to the wheels. The plan was designed by Mr. J. D. McIlwain, superintendent of the car shops of above named road, at London, Ont., and after a year's trial it has been decided to use it on all the passenger cars of the Great Western Division.

THE Philadelphia, Wilmington & Baltimore Railroad is constructing three sets of track tanks at its Wilmington shops. The tanks are to be laid down between Philadelphia and Washington, three on the north-bound and three on the south-bound track. Each tank is 1,000 ft. long. A tender of the latest Pennsylvania Railroad pattern has just been completed at their works. It is fitted with the scoop and holds 2,400 gallons. The use of the track-tanks will, however, enable this comparatively small tender to supply all the water needed on the run between Philadelphia and Washington. This distance can then be traversed without an intermediate stop, if such a long run is thought desirable.—*Railroad Gazette.*



COAL HOPPER CAR—BALTIMORE & OHIO RAILROAD.



COAL HOPPER CAR—BALTIMORE & OHIO RAILROAD.

WE give herewith perspective views showing side and end of the coal hopper-car of the Baltimore & Ohio Railroad, a detailed description of which, with drawings illustrating the construction, was published in the April number of the CAR-BUILDER.

Railroad Car Material.

The *American Machinist*, in an article on this subject, favors a larger use of iron and steel in the construction of cars. The writer says:

"The successful and economical operation of railroads having been so much influenced by the improvements in the manufacture of iron and steel, it might naturally be supposed that railroads would take the lead in adopting those materials whenever they could be used judiciously in construction, and in most respects they have done so. Yet amidst all this the curious anomaly is presented of the master car-builders, who control an important branch of construction connected with railroad equipment, keeping rigidly aloof from iron and steel so far as circumstances will permit them to do so. The fondness of master car-builders for wood as a building material resembles that of the British Lords of the Admiralty for England's wooden walls after wood had become obsolete as a ship-building material. Had the master car-builders kept in line with the progress of other railroad departments the whole car truck would now be made of iron or steel, and the sills, or even the whole skeleton of the car body, would be metallic. There has been too much inclination to regard any departure from established usages as a step away from the safe path. Iron tender frames are a most decided improvement over those of wood, and are becoming deservedly popular; but their use was deprecated for years by parties who thought that wood alone was suitable for that purpose. The success with the iron tender frame ought to encourage some enterprising car-builder to try a similar experiment with car frames. Advances of that kind could be made by degrees, and experience would demonstrate the strong and the weak points of the new building material. This would be a much better way of bringing it into use gradually than by building a car entirely of iron or steel and saying, 'If this does not prove so satisfactory as a wood-built car it is a failure, and we will stick to the timber.' By introducing metal gradually as a material for car building the present appliances for building and repairing wooden cars could be used until they were worn out, and the proper machinery for working metals could be provided as it was needed. During the transition of shipbuilding from wood to iron many composite vessels were built partly of iron and partly of wood as a compromise between the old and the new material, and they helped to bridge the chasm. A similar plan might work advantageously in leading the more conservative master car-builders into the way of familiarizing their minds with metal cars for a change to that direction must be made sooner or later."

The Russian Oil Fields.

The Standard Oil Company's sun may now appear to beam from a cloudless sky. Just such a sky as arched the prophet who only noticed the existence of a cloud "no larger than a man's hand." There is a cloud of this kind, far away as yet, no less distance than that which separates New York, and the Pennsylvania oil fields, from the Caspian Sea.

Aye! there's the rub! The Russian oil fields. A very young affair, but an infantile giant, whose growing power will yet make the Standard tremble in its patent leather boots. The growth of this distant oil field has been in the face of the most potent influences. Ignorance, bigotry, superstition, all stand in the way of the proper development of the Baku oil fields. When these barriers shall have been broken away, the cloud will begin to cast its shadow upon the great monopoly. The Baku field, the Tiflis, and other Oriental oil regions, are places where the name of Rockafeller is not known, and where there mention of Jabez Bostwick's name doesn't worry the humblest producer of crude. The pipe line in the Baku field doesn't pour shekels into the Standard's pocket, and there are no "frozen out" refineries on the shores of the Caspian Sea. In front of this oil land lie the markets of all Europe, and Asia, and Africa; within its borders is oil sufficient for the wants of the world for all time to come. The touch of civilization, the golden key of capital, will soon unlock this oily treasure-house. Where, then, will be the grip of the Standard on the consumers of Germany, of France, of England, and other lands now burning only oil from the upper Allegheny valley?

In spite of the backwardness of the Russian fields, as compared to their importance, look at some of the features of the trade exhibits. The Russian locomotive engine takes in oil for fuel while taking water into its tank. The value of petroleum as a steam producer has been more readily recognized in far-off Russia than in this country of many railroads. The scarcity of fuel is of course the incentive in Russia, but the fact remains that not only in locomotives, but in sea-going steamers on the Black and Mediterranean, refuse petroleum is used as fuel with the most satisfactory results, and by means of the most incomplete appliances. The chief objection brought against Russian oil is the small percentage of illuminant it contains as compared with the Pennsylvania product. This element will delay the day of victory for the Baku oil, but should the price of American crude be advanced materially, carrying with it the value of refined, the foothold of Russian oil will be correspondingly strengthened.

The depletion of American oil-producing territory means therefore two things, the encouragement of Russian oil in the European market, and the hastening of the day when the little cloud shall rise and fill the heavens and burst upon the Standard Oil Company, until the place that knew it shall know it no more.—*Independent Record.*

Tubular Iron Freight Cars.

Some new cars of this construction, built by the Gilbert Car Manufacturing Co. for the United States Tube Rolling Stock Co., have been on exhibition for several days at the track yards of the Hudson River Railroad, in New York City. They consist of two gondolas and a box-car. In the details of their construction they are not materially different from the cars built by the same company two years ago, a description of which was at the time published in the CAR-BUILDER.

The stenciled weights and capacities of the cars are as follows: One of the gondolas, weight 18,900 pounds, capacity 60,000 pounds; the other gondola, weight 16,000, capacity 50,000; the box car, weight 21,100, capacity 50,000. The gondolas are each 34 ft. 6 in. long, and the box-car 30 feet long over body-frames. The floor-frames consist of four pairs of wrought-iron pipes, $2\frac{7}{8}$ inches outside diameter, running longitudinally one pipe above the other, each pair being clamped together with malleable iron fastenings, with a suitable space between the pipes, the respective pairs answering to side and intermediate sills as in wood construction. The pipes are fastened to channel iron end pieces or sills by iron rods running through the pipes, and held to the end pieces by nuts. The body bolsters are of channel iron, filled with wood and trussed in the usual way. There are also four longitudinal truss-rods corresponding to the four pairs of pipes, with queen-post bearings between. The draw-bars, instead of being below the end-sills, project through them in the direct line of draft; and the center of draw-bars being the standard height above the rails, the body of the car is, of course, somewhat lower than usual, which also lowers the center of gravity. The drawgear is especially strong, the arrangement being such as to make it next to impossible to pull out the draw-bars or break the springs in buffing. The flooring is yellow pine 1¾ in. thick. It is nailed to square longitudinal pieces of the same timber bolted to iron brackets attached to the respective pairs of pipes underneath. The iron portion of the box car is of the same construction. Malleable iron socket-castings of a suitable pattern to receive the posts of the superstructure, are attached to the side-tubes, and to these castings the brace-rods are held by nuts.

The great point aimed at by the builders is to combine the greatest strength with the least weight, and it is claimed that this is accomplished to a greater extent than is possible in wood construction, and that there is consequently less dead weight and less wear and tear of the running parts in proportion to paying load. It is evident from a careful examination of these more recently constructed tube cars, that although the parts are all held together as firmly as clamps, bolts and nuts can hold them, yet in order to facilitate repairs, the entire structure can be readily taken to pieces, either wholly or partially. The cars have diamond trucks, 33-inch iron wheels, and brakes between the wheels of one truck.

With respect to their cost we are unable to give any particulars, but it probably does not much exceed that of wooden cars of the same class.

Railway Notes from Buffalo.

Buffalo is rapidly becoming a great railway centre. Tracks and crossings are multiplying in all directions, and already form a network so extensive and complicated that some of the lines have been compelled to raise their tracks so as to avoid grade crossings. These crossings, especially at East Buffalo, necessitate full stops, which are a serious delay to fast trains. The New York, Lake Erie & Western has a number of elevated crossings, and the West Shore has trestles and fills for the same purpose. This labyrinth of tracks, as it appears to an outsider, conveys the impression that very little system or forethought is shown in the general arrangement. The entire East Buffalo plain is at present in a fair way to become one vast freight yard, and it would seem to be highly important that there should be some concert of action on the part of the managers of the respective roads, so as to locate the tracks in accordance with a system that will economize space and provide at the same time for the most expeditious handling of trains. Many of the tracks are now in inconvenient positions not sufficiently accessible from the main lines, and curves are numerous where straight tracks would seem to have been practicable and vastly more serviceable. The present state of things can only be improved by some kind of co-operative rearrangement of the whole scheme, so as to bring order out of apparent chaos.

The freight and shop yards of the various roads centering in East Buffalo are all upon ground that is nearly level and of a clayey formation. The drainage is consequently very imperfect. Mr. Ross, the master mechanic of the Erie shops, is improving his track-yard and getting rid of the accumulated ashes and cinders, by filling in with them on the lower side to the depth of several feet. The ashes pack well and make a firm surface, which is at the same time sufficiently porous to absorb the rain and allow the water to pass off quickly.

The shops of the New York Central, at East Buffalo, are very busy with repair work. Mr. Chamberlain, the foreman, is sending out cars at the rate of about 1,100 per week. The shops are well arranged for doing work expeditiously, the raw material passing through them so as to correspond with the movements of the cars as they come in on one side and are passed out when the repairs are completed, on the other. A very good and much needed work has been begun in the yards by filling in with cinders and leveling up to the top of the ties, so as to make a dry surface better adapted to the movements of the men and the handling of the cars. As a precaution against fire, Mr. Chamberlain has taken a number of oil barrels, painted them red, and placed them here and there against the shops, where they are kept filled with water from the rain on the roofs. The barrels are marked "Fire" in white letters, and pails are placed near by, so that, in case a fire breaks out, it can be extinguished at the start. As an additional safeguard, there is a large reservoir in the yard, 100 feet long, 20 feet wide, and 8 or 10 feet deep, which is kept filled with water, and at one end of it, on a side track, is a tank-car on double trucks, the tank being 24 feet long 12 feet high, and as wide as a freight car. This car has a steam donkey pump for throwing a fire stream, and in an emergency can be hauled to any part of the yard. The yard engines supply the pump with steam by means of hose connections.

Railway Passenger Traffic in England.

The annexed table shows the number of passengers carried, and the receipts therefrom, on thirteen English roads (all lines of heavy traffic) during the half-year ending December 31, 1883. It will be seen that about 87 per cent. of the passengers carried are third-class. The second-class are about 8 per cent. of the whole, and the first-class only about 4½ per cent. About 75 per cent. of the revenue from passengers is derived from the third-class, and the residue is pretty equally divided between first and second class.

COMPANIES.	No. of passengers.			Receipts from passengers.			Total from passengers.
	1st class.	2d class.	3d class.	1st class.	2nd class.	3d class.	
Caledonian.	689 285	390,830	7,229,114	£79,432	£30,595	£277,952	£387,979
Great Eastern	633,327	1,818,011	19,150,982	93,442	112,660	602,711	808,813
Great Northern	455,975	925,181	11,208,738	89,814	61,347	444,874	596 035
Great Western	963,972	4,241,634	21,302,642	181,536	383,332	1,037,555	1,602,423
Lancashire & Yorkshire	782,455	1,167,579	19,636,177	58,449	49,540	542,213	660,202
London, Brighton & Sth. C.	1,009,085	2,066,201	18,807,583	120,991	131,156	459,338	711,485
London & North Western	1,246,005	2,093,609	25,335,955	303,003	220,687	1,233,775	1,757,465
London & South Western	1,312,159	2,484,811	14,214,209	137,353	155,369	550,774	843,496
Manchester, Sheffield & Lincoln	126,337	210,118	5,592,970	13,131	11,672	177,048	201,851
Midland	897,242	....	15,273,419	137,078	....	851,116	988,194
North British	827,804	354,525	8,085,066	77,569	22,108	296,279	395,956
North Eastern	574,657	539,611	18,229,555	92,785	52,162	724,409	869,356
South Eastern	718,477	1,521,306	11,442,411	129,598	125,551	388,145	643,294
Totals	10,337,780	17,813,416	195,508,821	£1,514,381	£1,356,179	£7,584,989	£10,455,549

The London & Southwestern return of passengers is exclusive of season-ticket holders. The Midland has no second-class cars.

An English Raid on Pullman Cars.

A writer in the *Saturday Review*, an English paper of the antiquated conservative, grumbling sort, thus relieves his mind in respect to the alleged conveniences of Pullman palace cars on English railways:

"But in turning to the more showy structures that have come from America one is really puzzled to guess why what is pompously termed a drawing-room palace car should ever be used twice by the same passenger. It is decorated in a style which leaves the mind of the beholder blank to all other thoughts, but the question what grudge the designer can have borne to travelers that he wished to consign them to an early lunatic asylum; while it suggests to the bad sailor associations which he would prefer absent from his mind. * * * Then the unfortunate passenger finds that, instead of an arm-chair to sit in, he has only a chair with arms. There is no corner to get his head back into for a quiet sleep, and he cannot settle himself into an easy position for reading. Presently, if the train is going fast, he finds that the car is actually rolling from side to side. True, there is little of the jolting motion which is the only annoyance in the ordinary carriage; he could even write with comfort. But this rolling begins to produce the feelings which that of a ship will do under similar circumstances. He looks around for a way out of his difficulty, and thinks that perhaps if there were a little more air he might be better. He orders a window to be opened. But, alas! he has no longer the control of the window. The open window would produce a draught at the back of some passenger's neck standing at the other end of the car. He has no resourse but to devote his energies to struggling against the feeling of nausea until the express train arrives at the next station—a long time perhaps. Meanwhile he congratulates himself that at least he has not to talk. But this delusion does not last long. An acquaintance has espied him from the other end of the car. And he brings and introduces three more acquaintances. And the traveler, almost overcome by nausea, has to invent civil speeches and to keep up the conversation and to strain his ears to hear the voices of the others above the noise of the rolling wheels and the rattling lamps.

"However well Pullman cars may be adapted for the people for which they were invented, it seems clear that they will not suit our habits or our railways. In America the speed of the train is slow compared with that of our great expresses, and, owing partly to the enormous length of the lines, and partly to the action of the frost on the road in winter, the permanent way is not maintained with that almost microscopic accuracy to which we have been accustomed. The arrangement of springs under the car is calculated, as far as possible, to neutralize the jolting that would be produced by the roughness of the tracks, but this very arrangement renders the whole structure liable to that rolling motion which produces feeling of sickness in many when the train is running at a high rate of speed. It becomes absolutely necessary also to warm the car artificially when the travelers have to remain in it for a week, during part of which time the thermometer may stand at many degrees below zero. This can easily be done by a stove placed at one end of the car and watched by an attendant. All these things make the Pullman car, if not a perfect, at least a fairly suitable means of conveyance for transatlantic purposes; but they make it an intolerable one here."

The writer has evidently ridden in a Pullman car, and has also been a boarder in an "early lunatic asylum." The Pullman vehicle appears to be, if any thing, the more dreadful of the two. The arm-chairs are so poorly contrived that he can't sleep nor read in them, nor find a corner for his head nor get into an easy position. But he can do all these things, of course, in an English railway carriage. And then the "sea sickness"—a strange malady for a loyal subject of a great maritime nation to be afflicted with, whose traditional boast has ever been that "Brittania rules the waves." Between the intervals of retching he gasps for fresh air, but an open window lets in a draught that hits somebody on the back of the neck, a thing which presumably can never happen in an English carriage. But, worse than all, he is forced, in a Pullman car, to choose between being sociable or uncivil, a state of things sufficiently aggravating, and which, doubtless, more than any thing else suggested the idea of a lunatic asylum. The writer also makes another suggestion, the astuteness of which is remarkable. "When the thermometer is many degrees below zero, the cars," he says, "can be artificially warmed by placing a stove at one end." Why not a "warm water can" for each passenger, a plan which has proved so effective for keeping people warm on English trains in cold weather? For a wonder, he makes no raid on lavatories or retiring saloons, the absence of which on English trains makes a journey by rail in that country a terror to civilized people. The omission is probably owing to the fact that he was so bewildered with the profusion of other inconveniences of the Pullman vehicle that he could not grasp them all during a single trip. Intolerable, however, as these cars are in the writer's estimation, he magnanimously admits that they are fairly suitable for the deluded people on this side of the water. This must be a real comfort to Mr. Pullman.

Railroad Car Axles.

An ex-railroad official writes to the *Iron Age* upon the subject of car axles as follows:

"In the reports of the condition of the iron trade I have been looking in vain for some word relative to one of the most important branches of not only the iron trade, but also of the greatest interest to railroad corporations, viz., car axles. In the market reports of iron, prices are given of almost every article manufactured, either of cast or wrought iron, save car axles, and this last article is really the most important of all, for upon its strength and quality so much depends as regards life and property.

"As an ex-railroad official my attention has been called to this important part of construction of cars, on account of the astonishing low prices now ruling, and I wish to ask of railway managers and purchasing agents if, in the economy of their purchases for car building, it never occurred to them that it is simply impossible to lay down \$5 and expect to get \$10 in return? If they do, it will be spurious. Upon inquiry I find that hammered-scrap axles are being made at the very insignificant price of 2 cents per pound, and at even lower prices. We all know that every one transacting business does so for what profit he can make out of it, and can we suppose that a concern will make and sell an article for 2 cents that costs 2¼ cents? I have been at some trouble to ascertain approximately the cost of making a car axle, and, as near as I can find out, good scrap iron, such as is only fit to make an axle of, costs from \$22 to \$24 per ton; the average price of coal is about \$2.75 per ton; the wages of expert axle-makers are as high now as when axles were selling at 4 cents per pound. Now, the result I arrive at is that the cost of an axle ready to turn up is not less than $2\frac{3}{16}$ cents per pound. Can it be credited by any sane man that such an axle would be or is sold for 2 cents per pound? And yet axles are sold for that price. The question then arises, Of what material are they made? This question will soon answer itself by the wrecking of trains caused by broken axles; and on examination the material will be found to be old rails or an inferior iron even worse than old rails.

"This is a serious matter, and one which railroad managers and purchasing agents should look into carefully, or they will find that some day they will wish they had paid 10 cents per pound for their car axles. The rapid rate at which trains are run makes this question of transportation of human beings of the greatest importance as to safety. There is but one railroad corporation in this country who properly consider this question, and they have their axles made of iron according to a formula of their own, and they pay a good round price, and I believe at this time are paying 8 cents per pound. I should like one better posted than I am to give the facts in regard to the manufacture of this important article, and if our railroads will not do as they should for the safety of life, limb and property, the strong arm of government should be invoked."

TROUBLE is sometimes experienced in the running of machinery by the stripping off of the teeth of gear wheels when heavy work is being done. In such cases it should be borne in mind that circular teeth will sometimes stand when all other forms fail. In the rolling mills of the Baltimore & Ohio road it is the practice, wherever heavy work is done, to make the teeth of the wheel consist of two semicircles connected by short, straight lines—that is, the side of the tooth on the pitch line will be represented by a short vertical line connected at the top by a semicircle, and at the root or base by another semicircle of the same radius. The straight part in the middle of the tooth on the pitch line is used to give clearance. Teeth of this kind are very strong, and will stand up to the work when those of "the most approved pattern" (to use the pattern maker's phrase) will shell off like corn from the cob.

Shop System and Management.

The economic advantages that can be secured in a manufacturing establishment by the introduction of a well-devised and practical system in all those branches where organization can facilitate work are well illustrated at the Wharton Railroad Switch Co.'s works in Philadelphia. These works comprise an extensive track yard, machine shops, foundry, office and sundry subordinate departments, all of which are merged into a system which may be said to begin at the entrance of the yard and end at the office or counting-room, its object being to enable every employé to perform his work in the easiest and most expeditious manner. In the yard is a network of railroad tracks which practically dispenses with a great deal of work that is usually done by a gang of common laborers. These tracks also extend through the machine shop in the form of overhead tracks, by means of which every man who runs a lathe or planer can place his work on these machines with little or no assistance. The tracks enter the yard at a high level, so that the coal, iron, sand and other heavy material can be delivered at the highest point on the grounds. The foundry and cupola are also on an elevation considerably above that of other parts of the yard and of the shops where the castings are finished. To all parts of the works where heavy weights have to be carried tracks of 20-inch gauge are laid, the rails weighing 16 to 20 pounds per yard.

At various convenient points, small turn-tables (shown in Fig. 1) are placed, and so arranged as to take the place of switches, thus reducing to a minimum the quantity of track required. Wrought iron frame trucks (Fig. 2) are used for carrying heavy weights, and to make their movement as easy as possible, they are furnished with a very superior anti-friction roller bearing mounted in a brass cage and requiring no oil. These trucks are made of different sizes by the company for the general market, but those used in the works have a 20 inch gauge. The top or platform is 5 feet long by 2 feet 6 inches wide, and 16 inches above the rail. Trucks of this description are largely used in rolling-mills, foundries, etc.; but as a labor-saving convenience their use could be more extended than it is and be more largely introduced in many manufacturing establishments. One or two men can with these trucks transfer heavy castings from the foundry to any of the shops, where, as at these works, they can be placed wherever they are wanted by means of an overhead track, trolleys and hoisting gear. These overhead tracks are furnished with switches, turn-tables and cross-overs, so that work can be readily transferred from one machine to another, and as no floor space is occupied by the tracks there is no obstruction to the passage-ways and no interference with the progress of other work. The finished work is, of course, delivered at a lower level, but as this comprises but a small portion of the raw material that enters the works—estimated in some instances as low as 28 per cent.—it is much easier to lift it to the level of the freight cars than it is to carry the raw material up to the places where it is used in accordance with the ordinary methods.

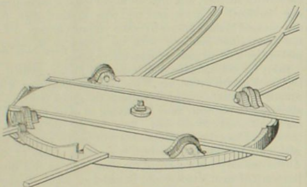


Fig. 1.

Every workman is furnished with a small blank form 4½ inches long by 3 inches wide, of which the following is a copy:

TIME OF NO.............. NAME..............................

SHOP......................... MACHINE..............................

ORDER No.	HOURS.	RATE PER HOUR.	AMOUNT.	Compared and found correct with Pay Roll. .... TIME CLERK.	Entered Cost Book Folio............ BOOK-KEEPER.
TOTALS.					

DATE 188

.... FOREMAN'S CLERK.

This form, as will be seen at a glance, is very simple, and when one of them is obtained from every man in the shop, the cost of any piece of work or of any operation that is being carried on can be very correctly ascertained. Blanks of a similar kind are also furnished to the foremen to be filled up with the particulars as to supplies and material used upon any order, and when the several items are charged up under the proper headings the business manager has a reliable record of cost that is very serviceable to him when figuring upon contracts.

The system, of which the above is but an imperfect outline, was devised by Mr. Edward Samuels, of the above named company, and is the result of careful observation and experiment and a thorough practical knowledge of shop economy and management. It is far more serviceable than the mere making up of a multitude of forms and blanks to cover every possible contingency of work, the result of which is complication and confusion which soon becomes a nuisance that can only be abated by the slow process of evolution toward something more simple and more worthy of being called a system. Many plans have been devised for systematizing the details of great business establishments. Some of them have had for their leading object, apparently, the prevention of peculation. They assume that every officer and employé, from the superintendent to the night watchman, is dishonest and will steal whenever there is a good opportunity. It is easy to see how such a system is sure to be doubly burdensome, by becoming an unproductive addition to the labors of every body connected with the concern. As the business grows the internal friction increases, and like a badly constructed and badly lubricated machine, the actual work it does is rendered unprofitable by the wear and tear and heating of the surfaces in contact.

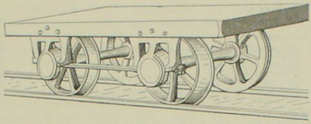


Fig. 2.

Glued-Up Work in Car-Building.

To the Editor of the National Car-Builder:

Carriage-makers have for some time been discussing the question of using built-up lumber for their work. The advantage of using wood glued together in thin layers is so great that its consideration by car-builders is profitable and may lead to valuable results. For inside work and for doors, the advantage of using ⅛ or ¼ inch thicknesses, with the grain crossed and glued up to the proper size, has long been known. Our best car-builders have been in the habit of making large panels, doors, saloon ends, sleeping car berths and partitions in this way, and their solidity and immunity from cracking have been remarkable. On account of the difficulty of making wide, outside panels stand, many roads are adopting 2-inch panels, and some builders are going so far as to put on two thicknesses of paneling, the inner panels being wide and running horizontally, while the outside ones are narrow and vertical. The question at once arises whether it is not possible to make the paneling beneath the windows of a passenger coach of large pieces of built-up lumber.

In an ordinary coach two pieces might be used upon each side to fill the space under the windows. Such panels, although of much larger size than are commonly made, would present no difficulties in the making, as they would be glued up from thin, narrow, stuff on the outside, while the inside would be of long strips set horizontally and as wide as could be conveniently handled. A ½-inch panel of large size, made up from veneers cut ⅛ of an inch thick, would be stiffer and stronger than ⅝ or ¾ inch single stuff. Such a panel would almost deserve the name of a plank. In some shops considerable preparation; would be necessary in order to glue and handle such large surfaces. Space for cauls and boxes as well as room for handling large work would be absolutely necessary. The actual expense of the preparations would, however, be slight, and when these had once been made, the cost of gluing up doors, saloon ends, ordinary panels and other large work, would be sufficiently reduced to counterbalance the outlay.

Among the advantages to be gained by the use of such a finish on the outside of a car would be the dead smooth surface on the outside, the small cost of putting on, the stiffness which would be imparted to the side of the car, and the solidity given to the framing. If the inside of the panel was canvased, either before or after gluing in place, the resisting power would be very great. The same would also be true if glue blocks were put in on all parts of the frame. The disadvantages, however, are by no means to be overlooked. They will probably occur to every builder of passenger cars who gives the plan a moment's consideration. The first of these would be the difficulty of repairing any injury which might be done to the outside of the car. In the opinion of many this would be a fatal objection. Difficulties of varnishing and finishing, and awkwardness of handling, will all have to be taken into account. The fact, however, remains that the wood put together in this way is free from shrinking in either direction, and will stay where it is put. These are, in my judgment, sufficiently strong reasons to justify the consideration of this method of building.

PHILIP.

Electric Lighting of Railway Cars in England.

Engineering contains an account of an experiment made recently on a train of the Metropolitan District Railway (London) for the purpose of testing the feasibility of electric lighting in railway carriages. The current was generated by a dynamo driven by an engine working at 120 pounds pressure, and indicating 7 horse-power, the dynamo, engine and boiler being placed in a parcels van. The intention was to take steam from the boiler of the locomotive, but the difficulty of doing so for a mere experiment led to the employment of an independent boiler. Fifty Swan lamps of from 16 to 18 candle-power were distributed through the train, and were lit at first for 8½ hours each day and afterwards for 6½ hours. The boiler was not well suited to the work and the coal was bad, but the result was taken as the basis for a calculation of what it would be if steam were taken from the locomotive. In such case the total cost of production, including interest on plant, would be 11s. ($2.66) per 1,000 lamp hours, the light being double that of gas, and costing 30 per cent. less than 50-candle gas of 12s. per 1,000 cubic feet.

Mr. W. H. Massey, under whose direction the experiment was made, maintains that the only practical way of driving dynamos on trains is by the steam from the locomotive. If connected with the car axles the light would go out when the train stopped unless accumulators were used, and these he contended had as yet no practical existence. Compressed air had been proposed as a reserve of power, but its efficiency was low, and its use involved waste of fuel. The question of different systems on adjacent lines was a difficulty, no doubt, but the same difficulty existed with air-brakes and was gradually solving itself. *Engineering* asserts that the test—of the detailes of which the above is but a brief summary—has demonstrated that the electric light may be supplied in railway trains at a cost rather less than the best gas-light systems now in use, and with a gain of about double the illuminating power; and furthermore, that the first cost of gas apparatus is nearly double that of the necessary electrical plant.

A Convenient Letter Book Index.

The business correspondence of a master car-builder upon some roads is so extensive, and he has so frequently to refer to his letter book, that any improved method of indexing must save a good deal of time. If he has occasion to refer to some particular thing in one letter among many others that he has written to the same person it is a great convenience to be able to turn to it at once, especially if he is in a hurry. The usual way in which indexes to letter books are made does not provide for this, and his patience and memory are sometimes seriously taxed in the effort to find what he is quite sure is there somewhere, although he cannot put his finger on the page. Mr. F. S. Pratt, Purchasing Agent of the Fitchburg Railroad, has hit upon a very simple plan of overcoming the difficulty, by enabling any one to refer at once to the subject matter of any letter by a glance at the index kept in the form as given below. The subject of letters is now usually written in a blank in the printed letter-head. This is copied in his letter book with the rest of the letter, and can easily be indexed with the name of the person addressed, as follows:

A.

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" 16...	Ames, Geo..............	Poplar Lumber............ ..	270
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B.

Date.	Name.	Subject.	Page.
Oct. 1 ...	Bailey, Chas..............	Castings......................	320
" 3....	Blake, Tho..............	Pay of Help	321
" 3....	Butler & Co	Irons for Truck..............	327

Railway Mechanical Laboratories.

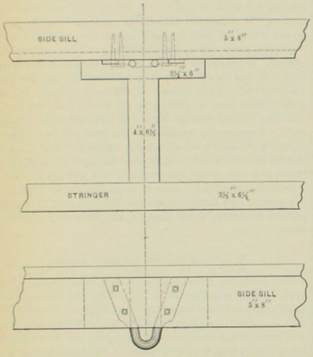
A gentleman who has long been familiar with the testing of material in steel works and large manufacturing establishments, writes us in regard to the need of a mechanical laboratory for the testing of materials used in the operation of railroads. Opinions coming from such a source are of importance just now, when the subject of laboratories is attracting renewed attention in railroad circles. The writer says:

"Such a laboratory as is proposed would require apparatus for subjecting all kinds of material used on railroads to tests as nearly as possible under the same conditions that exist in practical service. A chemical department would be indispensable for ascertaining the reasons for defects discovered by physical tests, in so far as any peculiarities of structure and endurance are due to the chemical composition of metals or other material. There should also be mechanism for testing oils and unguents, the endurance of bearings under given loads, and the frictional resistance of slide-valves under steam pressure—of all questions, in fact, that relate to the structural and working economy of locomotives, which are far from being the perfect machines that many people believe them to be. For this purpose the manager in charge of the laboratory should have a locomotive placed at his disposal, and especially for the testing of fuels with respect to their calorific value and methods of using.

"As to cost, I can say nothing definite. A small expenditure for apparatus would be productive of some good results. But the best possible laboratory could not, in my judgment, be organized and put in practical operation at less than $100,000. This sum would be sufficient to equip the establishment with machinery for testing large-sized sections of various kinds of material, and also to secure the services of the requisite number of competent assistants, as well as a first-class man as chief director, who should be a person whose age and experience would entitle his conclusions to the respect and confidence of the entire engineering profession. He should be something more than a mere graduate of a technical school. I have a great respect for these schools, and was a student of one of them myself. But I speak only what I know when I assert that fully one half of the graduates sent out by them into the busy world are a discredit to the schools. Some of these graduates may possibly be fitted by their studies and native capacity for assistants in a laboratory of the kind referred to, but the director himself should be a hard-headed, many-sided, thoroughly educated, experienced and practical *man*."

Fastening Check-Chains to Side Sills.

The drawing illustrates a very effective mode of fastening check-chain eyes to the body timbers. It has been very extensively used by the Pullman Palace Car Co. The eye is made of 1-inch round iron, the flattened ends being 1⅞ inch wide by ⅝ thick. A piece of timber 2½ × 6 inch is fitted over the eye after it has been screwed to place, as shown;



and then another piece, 4 × 6½, is inserted between the former piece and the stringer, which fastens it to the frame so securely that it cannot get away without splitting either itself or the sills. The longitudinal piece is usually fastened to side sill with lag-screws, but sometimes it is toe-nailed to it. The transverse piece is always toe-nailed with heavy nails.

Breakage of Car Wheels on German Rails.

In six months, on 42 lines of railway having a mileage of 35,718 kilometres, in 4,098 million kilometres of distance traversed, 4,123 breakages of car wheels occurred, while upon thirteen lines having 490 kilometres of road, no wheel-breakage was reported, This gives 12.23 breakages for every 100 kilometres of road, or 1.01 for every million kilometres traversed. Classified according to season of occurrence, we find that 352 breakages or 8.54 per cent. occurred in October, and the percentage steadily increases until we arrive at December with 435 cases of breakage and January with 1,562 or 37.87 per cent., from which it decreases to 592 or 14.36 per cent. in March. The temperature was reported in only about two-thirds of the above cases. There were 124 fractures which occurred at a temperature of about 32° Fahrenheit, 956 of which occurred at a higher temperature than 32° and 1,553 at a lower temperature. These statistics, taken together with the fact that fractures were much less frequent when wheels with iron tires were employed, show clearly the dangerous effect of cold upon steel. Classified according to materials, it appeared that 61 per cent. of the broken wheels were "crucible" cast steel, 48 per cent. were cast steel, and 33 per cent. were Bessemer steel. About one-half of the breakages were discovered by the inspectors at the stations, one-fourth in the workshops and running sheds, and the remainder while the cars were in motion. The largest per cent. of breakages was upon goods trains, though this does not prove much, as the number of miles traversed was not taken into consideration. Classified according to cars, the statistics show that for every 77 locomotive wheels which were broken there were 67 wheels of tenders, 52 passenger car, and 24 goods car, wheels broken.—*Railway Engineer.*

A CITIZEN of Leavenworth, going to his barn to milk in the dark of the early morning, got into the wrong pen, and undertook to milk a mule. He didn't remember which side of the barn he went out at, but expects his bucket down in a few days.

IT is estimated that every time a train of cars of the average length stops, it costs in wear and tear of material and loss of power, full seventy-five cents. This is what makes a conductor always look so cheerful when he hauls up at a flag station, in the middle of a snow-storm, to take on a string of onions and a man with a dead-head pass.

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EDITORIAL ANNOUNCEMENTS.

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THE COMPARATIVE VALUE OF FIRST AND SECOND-CLASS MACHINE TOOLS.

The relative difference in value to the user of good and poor machine tools seems not to be as fully understood by railway men as it might be, and it may also be said that machinists generally are more or less at fault in this respect. In forming a judgment as to the comparative economic value of such tools, the first cost in dollars and cents is apt to be the only criterion, although it is manifest that as between two machines of the same kind, and designed to do the same work, one of them may be strictly first-class in its construction and workmanship, and the other strictly second-class. This being the case, it is not to be wondered at that some shops, in the effort to turn out good work with facility and dispatch with second rate tools, labor under a disadvantage that is a continual tax on the earnings of the business.

The truth is, that in the present stage of progress in railway machine shop appliances, first cost should be altogether a secondary consideration. The primary and essential thing is good construction, good workmanship, and a capability of doing the most work and the best work. The cost of overhauling a second-class machine is often greater than any apparent saving in the purchase price. A large manufacturing concern not long since bought a horizontal boring-mill in preference to a similar but in every way a better tool, because the price was $75 less. Like most poor tools, however, it had to be overhauled, or practically rebuilt, before it could be used, and after expending some $400 in making new parts, reboring, etc., the owner complacently remarked, "I tell you, that is a pretty good machine *now*." After all the expenditure, it was after all only "pretty good," and by no means as satisfactory as the other one would have been without any repairing. This instance, it is safe to say, is not exceptional. The worst of it is that many of those who are having a precisely similar experience do not realize the false economy involved in it. A well made first-class machine tool is not liable to break down, or, at all events, its liability to do so is comparatively small. This is a point that should not be over-looked. If a shop has the choice between two engines of like capacity, and buys the cheaper one, and it breaks down and brings the establishment to a standstill for three hours only, it is equivalent to an addition of 25 per cent., perhaps, to its first cost, and this illustrates on a larger scale what is happening in a small way when a single tool gives out and has to be repaired.

The buyer, in the purchase of this class of tools, is apt to take the price figures and discriminate between one tool and another by simply subtracting the lesser sum from the greater. One tool is put down in the price list say at $1,200, and another at $1,500. The difference of $300 is very considerable—quite an item in the matter of expenditure. But are these figures conclusive of the matter in its economical bearings? We think not. The difference of $300 represents an interest account, say of $18 a year. The highest priced machine, then, in order to be as cheap as the other, has only to earn $18 per year more. In such case they would both be on an equal footing as to cost. Take, for example, two rotary planers, one of them strictly first-class, and selling in the market at $3,500, while the other, which is not first-class, can be had for $1,200. Saying nothing as to how much more work one will do than the other, the actual difference in the yearly cost in the shop will be $138, or the interest, say at six per cent., on $2,300—the difference in price. Yet, in most cases, the buyer will take the lowest priced machine instead of the best and highest priced, although the initial overhauling and the annual repairs that will have to be made, as everybody knows who is familiar with the two classes of machine tools, will go far toward offsetting the interest on the additional cost of the best machine. Even when a notable saving is made by one machine as compared with another, it is difficult to get for it a corresponding increase in price, and the best makers often feel discouraged in their efforts to make improvements, and at the same time compete with the products of inferior makers in order to make remunerative sales.

Take, for example, the double-headed planer, which in the quick return saves, say, 9 per cent. as compared with equally well made machines without the quick return, and also saves 10 per cent. more by having an extra head, making in all nearly 20 per cent. Now, for the best quality of these machines the improvements will hardly add 12 per cent. to the selling price, which is probably about $2,250. At the ordinary rates charged for time, etc., in the shops the work of such a tool would be rated at about 60 cents an hour. If it could be kept running steadily this would amount to about $6 per day or $1,800 for a year of 300 days. Increase the work done on the machine 20 per cent, and its yearly earnings would be increased $360. At this rate the machine would be a paying investment, even at a cost of $8,000 instead of $2,250. Considering every tool of the classes referred to as an appliance for earning money, it must first be ascertained how much work it will do, and secondly, how much the work is worth when it has been done. In estimating its working capacity its first cost becomes a very insignificant item. That machine is the cheapest that will turn out the most work with the least delay for repairs, etc. The amount of work performed and the interest on the greater cost are obviously the essential elements to be considered in deciding on the purchase.

Railway master mechanics are in a great measure blameable for not having the best and most suitable tools with which to do their work. A case in point may be cited by way of illustration. A master mechanic and purchasing agent went to inspect some machine tools at the works of a Philadelphia firm who build first-class machines and charge corresponding prices for them. The obvious merits and advantages of a certain machine were pointed out, and the master mechanic expressed the opinion that a better one of the kind had not been built. "Well," said the purchasing agent, "if that is so, and it will do the most work, it is the very thing we want, is it not?" "Yes, sir," said the master mechanic, "but you must understand that I can get along with a much cheaper one." "Yes, sir, but you say that this is the very best that is made, don't you, and isn't it then the best and most economical one for us—the one we want?" "There is no doubt about that," said the M. M., "but then you understand, of course, that I can make a cheaper machine answer my purpose." Whether he got the machine of which he had such a high opinion, we cannot say. He was so reluctant to take what he could have for the asking, and so anxious to be understood that he was not absolutely insisting upon having it, that he had only himself to blame if he did not get it.

This mistaken economy of trying to get along with something that costs less than the best, is bad for all concerned. For lack of the appliances best adapted to the work, it is soon found that the work costs more than it should, and the master mechanic is figuratively placed beween two fires. He has perhaps saved a few hundred dollars in the expense account and a trifling amount of interest, while he has sacrificed many times as much in the actual cost of the work turned out. Quite different from this is the policy (exceptional perhaps) of another master mechanic on a leading road. He wanted a first-class planer from the establishment of a first-class maker. Other machines of the kind, but of inferior workmanship were offered him, but he refused to take them, and waited a year or so before he succeeded in getting what he wanted, and after he did get it, the increased capacity of his shops for turning out work paid him for his stubborn waiting.

In crowded shops—and just now, crowded railway shops are the rule instead of the exception—an increase of five per cent. even in the work a tool will perform, is worth a double interest account, as against the tool. A certain firm, after some six months debate, put into their works a special lathe which cost $1,200. At the end of three months after putting it in, they were able to relieve their greatly overcrowded shop by taking out a boring-mill which the lathe had made unnecessary. This alone saved $500 a year, the wages of the man who run the mill. And this was not all. The mill was replaced by another tool for which there was not room before, which materially helped to increase the output of the establishment, so that the putting in of the special lathe was equivalent to an enlargement of the shop itself.

RAILWAY SAFETY APPLIANCES.

Train collisions involving great sacrifice of life are not as frequent in proportion to road and train mileage as they were many years ago. We have no very precise data to support this statement, but if it is not true it certainly ought to be. There are at all events very few disasters nowadays of the Norwalk, New Brunswick and Ashtabula types, notwithstanding the vastly increased volume of traffic and the quantity of rolling stock used in the handling of it. That this comparative immunity from accidents of the startling kind, or "wholesale slaughters," as they are termed, has been largely due to the introduction of improved appliances of the automatic sort is beyond question. That still more effective safeguards will be productive of like results in future is also beyond question. A great deal, however, yet remains to be done to reduce the record of "killed" and "injured" to a minimum.

A mechanical safety appliance, automatic or otherwise, is of itself only a blind, inert mass of matter, a mere instrument dependent on intelligent direction and supervision. The intelligence must be adapted to the instrument. A boy can feed a printing press or nut-tapping machine, the operations of which are uniform and unvarying, attended with no risk of explosions or life-destroying collisions, and imposing but a slight tax on the judgment of the attendant. With the management of railway switches and signals it is different. However good these appliances may be in themselves, or theoretically, their value as safeguards depends upon a mental vigilance that should never be relaxed, and an intelligent comprehension of the worst consequences that may result from a moment's heedlessness. It does not follow, in railway practice, that the greater the mechanical completeness of the appliance the less is the skill required in its superintendence. It may be a labor-saving device so long as it works as it is intended to work, but, as a rule, it is not brain-saving nor labor-saving when it works wrong through neglect or inattention. How many accidents have occurred, the sickening details of which have been paraded in startling head-lines for days in succession, caused by the absence of that degree of intelligence which could not be secured at "a dollar a day," but which would not have occurred had the safety appliances for their prevention been supplemented as they were intended to be by intelligence of a higher order.

A duty may be honestly and conscientiously, but not efficiently performed. A certain place not to be named to ears polite is said to be paved with good intentions. Misplaced switches figure largely in the record of accidents, and yet it would be unjust to regard switchmen, as a class, as any more depraved, indifferent and heartless than the general run of people. If each one of them had another man to watch him and keep him on the alert the chances are that the responsibility would merely be divided between them without any actual increase in vigilance. The only practical remedy would seem to be the employment of men of a grade considerably above that of ordinary day laborers, and at a correspondingly higher scale of wages. Or, a system of alarm clocks that will infallibly give notice so the switches can be duly inspected before the arrival of trains. Something of this kind is being tried, we believe, at one of the stations on the Boston and Albany road.

RAILWAY ROLLING MILLS.

The economic advantages of rolling mills as a part of the machinery equipment of a railway can hardly be estimated with any degree of accuracy without an actual trial and a careful observation of the results. Several years ago the Baltimore & Ohio Railroad Co. erected a rolling mill chiefly for the purpose of utilizing the large quantity of scrap that had accumulated along the line and for which there was little or no market. This was done at the suggestion of Mr. John C. Davis, the former Master of Machinery of the road, who had long been familiar with the construction and operation of these mills. The resulting profits and advantages increased from year to year, and the plant was extended as new branches were added to the main line, until the company now makes all the iron used on the road, including bridge material, round and bar iron, spikes, bolts, nuts, fish-plates, channel and T-iron, I-beams and boiler plate. Puddling furnaces have been added as the business of the mills developed, and when the road's stock of scrap was exhausted, outside scrap was purchased and also large quantities of pig iron. The shipments of manufactured iron from the Cumberland mills to the various shops and stations along the line, average about 750 tons per week.

Shapes of every kind are turned out at about the cost of bar iron, and are charged at a uniform price. If it is desired to introduce any special feature of construction in cars or engines, the labor of the master car-builder or master mechanic is greatly facilitated by being able to obtain any shape that may be needed at the regulation price of, say, 3½ cents per pound. It often happens that the cost of a piece of work can be materially reduced by the adoption of some special section of iron, which, upon roads that do not make their own iron, would be out of the question on account of the increased cost. Here, however, the best forms for wrought-iron bars can be adopted quite as easily as the forms of castings, and with little or no extra expense, since the making of the rolls, which is included in the work of the machine shops, is practically on a par with pattern-making. The convenience of a rolling mill also effects a great saving in the cost of axles and the frames of locomotives, and with a decided improvement in quality also. The manufacture of axles at the Mount Clare shops may be cited as an illustration. The material used is bar iron, cut to the proper length, piled and strapped and put into the furnace. Every portion of the pile is clean and of the best quality. In some cases, when flat iron is wanted for other purposes, 2-inch square bars are used for piling. With this kind of material these shops can turn out 128 axles a day. The standard coupling-link of the road is made from special 2 × 1-inch iron, the cross-section being somewhat barrel-shaped. The pins also are made of special iron. Throughout the shops, in fact, special shapes are adopted with a view to their suitableness and without reference to market prices, the rolls being turned to meet every requirement.

In using ordinary scrap, it is absolutely necessary to pile and hammer before working into shape. In other words, a billet must be made which requires one heating and one hammering before it is put upon the porter-bar and into the form it is finally to take. When, however, the scrap consists of short pieces of bar iron, clean and bright, as is the case at these shops, it is possible to begin the pile on the porter-bar and continue the piling directly upon the work itself. It is clear that when an axle is made directly from flat bar iron, its uniformity and soundness must be greater than if made of billets of heterogeneous materials and varying quality.

In view of the large consumption of iron, and the abundance of ore and fuel along the line of the road, it may be asked why the company has not built blast furnaces so as to avoid the necessity of buying pig metal. This would have involved the hauling of ore and fuel considerable distances, when purchases of pig could be made from furnaces at various points at a less price than it could be made by the company. It was at one time proposed to establish Bessemer works, but the high royalties then asked, together with the interest on the capital that would have to be invested, caused the project to be abandoned. After careful estimates had been made and considered, it was thought better to buy the steel at the average prices that had prevailed for some years, than to make it, and the subsequent low prices have confirmed the wisdom of the conclusion.

CONSERVATISM AND OLD FOGYISM.

It is a very common thing nowadays to refer to people of long and varied experience as fossils and old fogies because they do not indorse with alacrity every newborn theory or idea of which this progressive age is so prolific. These disparaging terms are often applied to men who have for a long time been identified in one capacity or another with the growth and extension of railroads, and especially to those who have been, and are still, connected with the locomotive and car departments. Being in literal strictness practical men, they are as a class more inclined to adhere to methods that have stood the test of experience than to encourage innovations the utility of which is fairly open to question. This is conservatism in the usual sense of the term. It may be said that conservatism differs from old fogyism only in degree. This is very true, but the degree is every thing. Conservatism can only be a bad thing when it is the outcome of a sluggish habit of mind, content with things as they are, and shrinking from the labor of research and investigation. This country, with its diversified industrial activities, is not a congenial soil for the development of bipeds who are content to travel with their backs towards the cow-catcher, seeing nothing until after they have passed it.

That some roads are a little too much wedded to ancient methods and practices is very probable, while there are others which have such a repute without deserving it. One of the oldest of the so-called trunk lines it has been the fashion to speak of as being behind the age in many things pertaining to its equipment and operation, merely because its methods in respect to car and locomotive construction are not in many of their details in accord with the prevailing practice upon other leading lines. A continuous draw-bar for freight cars has been classed among the improved appliances of a comparatively recent period, and in no respect identified with old fogy devices. Yet experiments were made years ago by the officials of this road to test the practicability of such a device with a view to its adoption on its freight equipment. The experiments were favorable, a continuous bar was adopted, and it has been in use on the road ever since. Unsuccessful experiments were subsequently made by other parties with a similar device, which would not work because it contained a feature which made it worthless, while with the older one the difficulty had been avoided by a modification which the modern inventor had not thought of. While discussing this matter of the draw-bar with one of the officers of the road referred to, a patent specification of recent date was received by mail, the subject of which was a spark-arrester identical in its details with one which had been put on the road and thoroughly tried in 1861, and which proved to be radically wrong in theory and defective in its practical working. Yet should the same parties who tested the device nearly a quarter of a century ago now refuse to listen to the claims of the newly fledged patentee, they would doubtless be regarded as genuine fossils. Another patent has been granted quite recently for blowing back the sparks from the smoke-box to the grate, and still another for a feed-water heater to be attached to the barrel of the boiler underneath, both of which were tried upon this road years ago and found to be valueless.

The General Superintendent of Motive Power of a great trunk line has, within the past year, been trying a number of experiments in respect to certain details of locomotive construction, although the former Master Mechanic of one of its leased lines had made the same experiments seventeen years ago, and demonstrated that the objects sought to be gained by them were impracticable, at least on his line. In respect to plate frames for locomotives it may be surmised that should the Master of Machinery of the Baltimore & Ohio road decline to discuss their advantages and disadvantages with some half-crazy inventor, it would no doubt be attributed by him to a lack of enterprise on the part of the management; yet it is probable that this road has to-day more engines with plate frames than any other road in the country. Its long use of the camel-back engine, with its sloping boiler and inclined crown-sheet, has been looked upon as an evidence of excessive conservatism. The most advanced practice, however, of the present day shows that this form of crown-sheet is correct, and that engines now built for running upon heavy mountain grades have their crown-sheets much lower at the back than at the front; an arrangement that brings the sheet to the line of flame as it leaves the coal and passes to the tubes, thus increasing the heat, while the greater depth of water at the back adds somewhat to the weight on the drivers, and also prevents the uncovering of the sheet in descending steep grades. These points, as might be supposed, were carefully considered long ago by the officers of a road which had a grade of 116 feet to the mile for 17 miles or more. Verily, that kind of conservatism which results from investigation may not be "progressive" in the popular meaning of the term, but it is none the less a synonym for wisdom.

PASSENGER CAR FRAMING.

There are in general use three distinct styles of framing for passenger car bodies. These styles are so essentially unlike in respect to the important element of strength as to make it worth while to consider the mechanical principles that are involved in each.

In the first of these methods, and the one that has been the longest in use, a so called window-brace is introduced below the windows and between the pairs of window posts, together with a vertical rod lipped over the top of the brace, so that the brace and rod take a bearing against the post and convert the side frame into a truss, the sills, truss-plank and frame being closely bolted together for the purpose of securing the requisite stiffness. It is claimed by those who favor this method of construction that the side of the car is thus rendered capable of sustaining the load, and that by tightening up the brace-rods, even after the car has sagged somewhat, the body can be brought up to its original camber.

Another, and more recent method, is to dispense with the window braces and vertical rods by substituting arched trusses and body-braces extending from the bolsters to compression beams near the window-rail. These braces, which are from 6½ to 8 inches in width, and ¾ to 1¼ inch in thickness, are gained upon the posts and cut into the panel-rails, and the paneling firmly fastened to them with screws. Sometimes it is glued and nailed. This method of bracing makes a solid structure of the car wall, by securing all the parts together with great rigidity, so much so, that the original camber is not expected to be changed by any of the ordinary working strains to which the parts may be subjected. If it is desired, however, to change the camber, it can be done by means of the body truss-rods. There is also a modification of this style of framing, which consists of a truss-arch extending from bolster to bolster, with a diagonal brace at each end reaching from the bolster to the belt-rail, the arch and braces taking the place of the ordinary truss-plank.

There is still another method of body framing which has its advocates, and which may be called the "coach-body" system, in contradistinction from the other two. It consists in halving the rails upon the posts, and thus dividing the lower framing into small rectangles. Sometimes there are two or more of these rails between the panel-rail and the floor. The object of this construction is to make that part of the car side, between the windows and the floor, as strong as possible, and also secure as substantial a foundation for the paneling as can be had with a given quantity of timber. There being no system of bracing, strength derived from this method of framing amounts simply to what can be obtained from the stiffness of the wood and joints. The body of the car, with its load, is really carried by the truss-rods.

Each of these types of construction is subject to a great variety of modifications, according to the individual preferences of builders. Sometimes two of these types, or parts of two, are combined to some extent, but they are none the less distinct. The question is, Which is correct? Or, to put it more broadly, What is the correct or governing principle in accordance with which the side frame of a passenger car body should be constructed? While the limits of this article preclude any exhaustive examination of the subject we may suggest as a preliminary matter, that it should first be determined whether the material for the construction should be wood or iron, or a combination of both. Having done this by ascertaining the amount of resistance or working strength obtainable from each, it will be comparatively easy to make a proper disposition of these materials in the structure. Wood is strong and elastic, but as compared with iron is lacking in rigidity, and is consequently more easily indented by pressure. Braces, under the stress of heavy loads, have a tendency to sink into other timbers with which they are in contact, and to crush under great pressure. The elastic properties of wood are both an advantage and a detriment—an advantage in permitting, like a wicker-basket, a very considerable amount of motion before there is any actual breakage, and a detriment in the lack of rigidity, requiring brace-rods to keep the joints tight, prevent distortion and preserve the necessary rigidity. Judging from a careful inspection of old cars, the difficulty of keeping the sides from bulging in and out is as great as in preserving the camber. Iron in car-building is valuable mostly for its tensile strength. In the form of truss-rods it is capable of standing a heavy strain without much elongation and consequent sagging of the car, and as it can be more firmly secured in place than wood, it seems to be better adapted for carrying loads. This being the case, it is believed by many car-builders that the best construction is that in which the entire load is carried by the truss-rods, leaving wood to be used merely for the purpose of making a strong, and at the same time an elastic, car side or wall.

HIGH SPEED ON AMERICAN RAILWAYS.

It is generally conceded that there is some pretty fast running on English railways, even after making allowance for exaggerated reports. The average speed of the "Flying Dutchman" trains between London and Bristol, on the Great Western, as stated upon good authority, is 45.6 miles an hour, including two very short stops, and that of the "Flying Scotchman" trains between London and York, on the Great Northern, 48.2 miles an hour, including one stop of six minutes. This last, however, is exceptional. The fair running average, including stops, of English express trains making long runs is 45 miles an hour. There is, of course, a remunerative demand for this rate of speed, or the trains would not be run. In the United States, however, it is only within a recent period that any very considerable portion of the business community has asked for any greater maximum speed between our principal cities than 40 miles an hour. It may be said, indeed, that an average rate of 35 miles for what are called through trains, has hitherto proved quite satisfactory from a business standpoint. But with the growth of our chief cities in population and commercial importance has come a demand for faster trains between these points, and railway companies have been called upon to provide engines adequate for the service. The geographical location of our large cities is such that the transit between the principal ones on the Atlantic coast has usually been made in a single night without encroaching on the business hours of the day, and so long as there was no pressing need of trains that would make these distances in the morning or evening, the railway management aimed only to provide transportation at moderate rates of speed, as compared with the reported fast running on English roads. With respect to the longer distances, the time between New York and Chicago has of late been reduced somewhat, but in former years it practically amounted to a day and a half, and for trains leaving either city in the evening, an increase of speed so as to cut off one night was of no very great advantage either to the passengers or the railway companies. Under these circumstances, sleeping and drawing room cars, with all the luxurious concomitants of modern railway travel were introduced, the result of which was an increase in the weight of trains very much exceeding the average on European roads. Yet it is not difficult to run these trains at a rate of 35 miles an hour, with the American type of passenger engines, with their elastic arrangement of springs, 17 × 24 inch cylinders, 66 or 68-inch drivers, and flexible wheel-base. To get the steam that is required, coal must be burned at a rate per square foot of grate surface that makes economy out of the question. But even if economy were of no account, the limit of fuel consumption has been reached, and the coal has to be burned so rapidly that it is impossible with the ordinary form of boiler to supply the requisite amount of steam. For a first-class engine, 1,300 square feet of heating surface is scarcely sufficient to develop 1,000 horse-power (which the service requires, at the least), and if the fire-box is to be turned into a blow-pipe, the boiler can hardly be expected to last very long, nor can the fire lie very quietly on the grate. The tremendous back pressure necessary to produce the draft for this wasteful burning is a very considerable tax on the engine.

This being the condition of things with respect to the shorter distances between our large seaboard cities, and the longer distances between each of these and the chief cities of the West, any increase of speed in the transit from one to another, in order to be of any great advantage to the business community, must average as high as 55 or 60 miles an hour. But when our locomotive builders are called upon to furnish engines capable of hauling trains as heavy as those that are now running, at a rate of speed as low even as 45 miles an hour, the problem begins to look a little serious, and at 50 and 55 miles an hour it becomes formidable. Not that the standard type of passenger engine can not make 60 miles an hour easily enough with a proper load and upon a good track, but when the trains are composed of eight or ten Pullman sleepers, in addition to mail, express and baggage cars, the limits of what is termed a proper load are somewhat exceeded.

After analyzing the complaints of various master mechanics setting forth the obstacles in the way of meeting the demand for high speeds, the trouble does not appear to be in the side-rods nor in the size of driving wheels. The horse-power capacity of 18 × 24 cylinders seems to be ample for doing the work. Reversing arrangements, brakes, the carrying of the needed supply of water, fuel, etc., are things of inferior consequence in comparison with the question of steam supply for the cylinders. After making the boiler as large as is practicable, and putting in as many tubes as safety will permit in order to secure a good circulation, the master mechanic is compelled to thrust his fire-box down between a pair of wheels that run on rails 4 ft. 8½ in. apart. Right here is the obstacle to high speed with heavy loads.

To sum up, it must be said that the designer of a locomotive that shall be capable of an average speed of a mile a minute under the existing conditions of passenger traffic and of road-bed and track in the United States, is brought face to face with the question of a radically new construction of locomotive boiler, the old construction having reached its limit of usefulness. And not only is he forced to confront this question, but still another one of equal or greater magnitude which lies behind it, viz: Will any new form of boiler that can be devised be able to do the work that is required of it?

DIVERSITY IN RAILROAD BOOK-KEEPING.

It is manifest that the chief objects to be attained in the construction of American railroads can not be perfectly realized until their management and operation are such as to make them approximately, at least, a uniform system. At present this is far from being the case. Diversity is now the rule, or the prevailing practice, rather, and this condition of things seems likely to continue for an indefinite period. The obstacles in the way of putting the multitude of individual roads and the scarcely less numerous systems of roads on a common footing, so the actual financial condition of each and all can be accessible to stockholders and the general public, are very formidable. Absolute regulation and control by the Federal Government, to such an extent as to override State interference in the form of conflicting local laws, would seem to be indispensable to the unity which is implied in the idea of a general system. But however attractive this scheme may be in theory, the idea of federal control, except to a very limited extent, is impracticable. To say nothing of the absence of constitutional authority, the exercise of such a power by the central government would be looked upon as a step toward centralization, and as involving a radical change in the structure of the government itself. To expect, on the other hand, that the time is not far off when the local legislation of the several States with respect to railroads will be practically uniform, is absurd. However desirable it may be to have such a system of accounts and form of reports as would lay bare to public inspection the condition of every road, with nothing mystified or covered up by a juggle of figures that misleads in many cases the managers themselves as well as unsophisticated outsiders, such accounts and reports are only to be met with now and then in a fragmentary way, and not as integral parts of a well-devised system applicable to every railroad company, and to which each and all must conform. Equally chimerical is it to suppose that individual roads or systems of roads, with independent organizations and management, and whose business is more or less competitive, will ever voluntarily agree upon the same methods of detail in the keeping of accounts and in the form of reports, so as virtually to systematize what is often called in a loose kind of way the great American railroad system—great in its amplitude and wonderful growth, but not great in its organization collectively, or with respect to its component parts.

The lack of uniformity in the methods of railroad book-keeping is an evidence that at least some of the prevailing methods are defective, and that the reports based upon them are, as a consequence, misleading and deceptive. The opportunity is afforded for concealing, misrepresenting and glossing over the affairs of these corporations, thereby deceiving the public, and not unfrequently the managers and directors themselves, who do not clearly understand the working of their own system of accounts. The books may be accurately kept, and the results adduced from them may be truthful and legitimate, but not representing the actual facts in respect to the real condition of the roads. It must be obvious to any one who is familiar with the principles of book-keeping that if the construction account of one road is charged with an expenditure or liability, which, on another road is charged to current expenses, or *vice versa*, the two roads will in such case stand upon a different footing in the tabulated returns. And so in regard to maintenance, equipment, betterments, etc. If these accounts do not represent respectively the same, or nearly the same items in every case, or, what is worse, if they are manipulated in such a way as to make the face of the balance sheet deceptive, a road may be verging toward insolvency while it is apparently doing a safe and remunerative business. One road, for instance, replaces the iron rails on its old track with steel rails, and charges the whole outlay to construction, although not a mile of new track has been laid. Another road in a similar case meets the outlay at once out of its net earnings. In the former case a large surplus may be figured out in the face of accumulated liabilities and prospective insolvency, while in the latter the value of the property has been greatly increased, although the company may not be able to pay a dividend. With such diversified methods prescribed by numerous and dissimilar arbitrary rules, in connection with the old idea, not yet extinct, that the accounts of railroad corporations are matters of private rather than public concern, the apparent balance of net earnings may be increased or diminished without much regard to the facts of the case.

In England, we believe, railroad accounts are kept and returns made in a form prescribed by Parliament, and the information that we get here from Poor's Manual is obtained there on a much more thorough and satisfactory scale from a "Blue Book" prepared in the statistical department of the Board of Trade and under the authority of government. Something of this kind is needed here; but, as we have said, the obstacles in the way of maturing and carrying out such a plan under our complex system of federal and state jurisdiction are next to insurmountable.

Master Car-Builders' Association Circulars.

The following circulars have been issued by the committees of the Master Car-Builders' Association, appointed to report upon the subjects named at the annual meeting in June. The circulars are addressed to the members of the Association:

BRAKE SHOES, BRAKE BEAMS, ETC.

With your experience what do you consider the most economical brake-shoe, wrought or cast-iron or the so-called "Congdon Shoe" (which is a combination of both metals)?

Do you think that the so called "Congdon Shoes" are better than either cast or wrought-iron shoes?

Do you think truss-rods applied to brake-bars are useful?

Would you recommend either iron or steel as a substitute for wooden brake-bars?

What do you consider the best—solid brake-heads and shoes combined, or independent heads and shoes, made so that shoes may be removed from the head and renewed?

What do you consider the safest and most durable way of hanging up brakes?

Would you recommend that brakes be applied to both trucks of each car, and if so, should they be connected?

Do you think that the Congdon Shoe wears or cuts steel tires more than cast-iron shoes?

Would you recommend what is known as the "Christie" brake-head for adoption? If not, will you state what, in your judgment, is the best brake-head and shoe?

Answers to this circular should be sent as early as possible to L. Packard, Chairman of Committee, New York Central & Hudson River Railroad, West Albany, New York.

PLANS FOR CAR SHOPS AND ARRANGEMENT OF MACHINERY.

What description of building do you consider most convenient for the erection and repairs of passenger and freight cars?

Have you seen, or had any experience with, circular erecting shops with turn-table? If so, how do they compare with rectangular buildings with transfer-table in first cost of building and in economical execution of car-building and repairs?

How many cars do you consider advisable to erect or repair on one track? And what length of track would you require for each car?

What is the minimum distance you would have between centers of tracks in rectangular buildings? In case of circular shop, give this distance on inner wall or circle.

In tracks used for the repairs of cars do you recommend pits?

If so, what length, and also depth below rail, should they be?

What material do you prefer for flooring of car-shop? If plank, should it run parallel with or at right angles to tracks?

Do you recommend a roof of clear span from wall to wall, or one supported by one or more intermediate posts? If the latter, how do you recommend their being spaced?

Of what material should roof be constructed, both truss and covering?

What height should be given between top of rail and bottom of truss?

Do you consider skylights essential? If so, in what form should they be applied? Should they have vertical sashes in clear story, or sashes at same angle as, and laid directly on, main roof?

Give dimensions and style of door for erecting shop (with or without sash), and which way to open.

How should shops be heated?

Give diameter of turn-table or length of transfer-table, according to which you prefer, and most economical mode of operating same.

AUTOMATIC FREIGHT CAR TRUCKS.

Do you consider it necessary that freight-cars be fitted with automatic brakes?

Have you had any experience with automatic brakes suitable for freight cars?

If so, please give the name of the brakes.

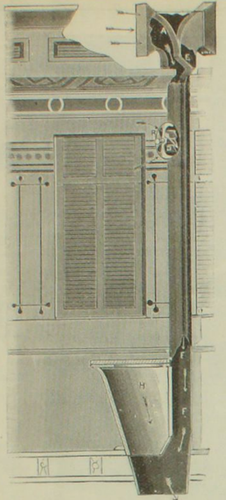


Fig. 1.

What failures are peculiar to each of the systems you have had experience with ?

Are these failures capable of being overcome, or are they insurmountable, and consequently sufficient to condemn the brake ?

What is the maximum sum you would feel warranted in expending per car in the application of an automatic brake ?

FREIGHT CAR ROOFS.

Assuming that the first object of a roof upon box cars to be protection of the contents of the car from the elements, and second, to assist in giving strength and stiffness to the sides and ends of the car, and considering that car roofs are now commonly classed as follows:

What are known as double-board roofs, with or without felt or other lining between the boards,

Single-board roofs covered with tin or other sheet metal,

Roofs made of metal sheets fastened to carlines, etc., and covered with single boards.

Which of these forms of roofs, or others of which you may have knowledge, will best meet the following requirements, and what will be the relative cost and cost of repair ?

Absolute protection from dampness, caused by rain or snow ?

Least danger from being disturbed by wind ?

Least danger from being damaged by nails being driven into it and men running over it ?

Least danger from fire ?

Best style to give lateral and diagonal stiffness to the car top. Also, whether some plan of diagonal bracing or tie rods should not be adopted ?

Speed on English Railways.

The London *Railway News* gives the following figures from a paper, by Mr. E. Foxwell, on English express trains :

Runs.	Miles.	Run in— H.	Run in— M.	Average run.
Grantham and King's Cross	105	2	4	51
Leicester and St. Pancras	99	2	7	47
Carlisle and Edinburgh	98	2	20	42
Nuneaton and Willesden	91	1	57	47
Derby and Liverpool	91	2	3	44
Preston & Carlisle	90	2	10	41
Skipton and Carlisle	86	1	55	45
Chester and Holyhead	84	2	0	42
Rugby and Eusten	82	1	50	45
Grantham and York	82	1	39	50
Newcastle and York	80	1	42	47
Victoria and Dover	78	1	45	44
Paddington and Swindon	77	1	27	53
Cannon Street and Dover	74	1	39	45
Carlisle and Carstairs	73	1	31	48

"Running average" includes time of making stops at stations. Its distance from "average speed," or time from platform to platform, excluding time lost in stops, is shown in the following table of the long runs in England:

	No. of trains.	Aver. speed.	Running aver.	Mileage.
Midland	104	53	46	5,512
Northwestern	98	60	45	5,880
Great Northern	49	73	50	3,616
Great Western	24	56	48	1,344
Great Eastern	24	56	42	1,362
Brighton	23	45	42	1,047
Northeastern	20	56	44	1.120
Southwestern	13	47	44	615
Southeastern	12	66	42	795
Chatham and Dover	8	63	45	504
Caledonian	8	59	45	476
Glasgow and Southwest	8	58	44	468
Manchester, Sheffield and Lincoln	8	48	43	390
North British	7	60	40	423
Total	406	58	45	23,550

SMITH and Jones were at the menagerie, and the conversation turned upon Darwin's theory. "Look at that monkey," said Smith ; "think of its being an undeveloped human." "Human !" said Jones, contemptuously, "it's no more human than I am."

AS one of the evening trains was coming into the Springfield depot the other night, a little girl who saw the flaring lights and general diabolical appearance of the place, nestled up to her mother's side, and inquired in an awe-struck whisper, "Mamma, is this hell ?"

THE latest Yankee invention is a new-fashioned traveling-bag, in which a man can stow himself upon a journey and travel without the knowledge of such sponges as dun a man for his fare. He places himself in the bag, and, taking it in his hand, passes for baggage.

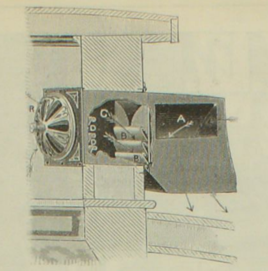


Fig. 3.

THE O'CONNER CAR VENTILATOR

The engravings illustrate a method of ventilating railway cars, of which Mr. E. O'Conner, of Cleveland, Ohio, is the inventor. Fig. 1 snows its application to saloon hoppers, and Fig. 2 its application to air-heating car stoves. As will be seen by the cuts, the air is admitted through the hoods *A* opening in opposite directions on the roof, the inflowing current induced by the motion of the car operating the valves *E* so as to admit the air from whichever direction the car is moving. The pipe or flue *F*, in Fig. 1, is usually 3 × 8 inches in dimensions, and the mouth of the top ventilator being six times as large in area as the opening into the hopper, the force of the downward current is so great as to prevent any upward draught or suction in the hopper, thus carrying off all noxious odors. The register *R*, with its slats *D*, prevents the ingress of cinders and also ventilates the closet. In Fig. 2 the air is admitted in the same way, passes around the heater inside the shell or case, and is then forced out and into the car through the registers under the seats. The exhaust ventilation is provided for as shown in Fig. 3, the ventilators being attached to the sides of the clear-story, with register and two sets of slats, *B* and *D*, which keep out dust and cinders. These exhaust ventilators can be made of any size to fit registers already in use.

These ventilators are manufactured by the Cleveland Car Ventilator Co., at Cleveland, Ohio, and are made of the best quality of galvanized iron or tinned iron sheets strongly riveted and soldered. They have been in use on the C., C., C. & I. road for two years and upwards, and are highly approved by the general master mechanic and the master car-builder.

Brass Driving Boxes.

The practice of the Baltimore & Ohio road in the matter of solid brass driving boxes presents some advantages, a knowledge of which may be useful to other roads that have brass foundries and make their own brass castings. These boxes are charged upon this road at 16 cents a pound, which is the ordinary rate for all brass work, and the old brass is received back by the foundry and credited at 11 cents per pound. The boxes can be finished up at about half the cost of finishing cast iron boxes, and being solid no labor is expended in fitting a brass into the box. It has been found that these boxes, when made of the right mixture, will wear as long as combination boxes. When an accurate system of accounts is kept, with a knowledge of every source of waste in the foundry, there are many parts of an engine which can be made from solid brass more economically than from a combination of brass and iron. The loss in remelting being known, together with the cost of the raw material and of the labor expended in the process of making and turning out, it is easy to determine what iron castings can be economically replaced with brass. But if the attempt is made to substitute brass for iron without an accurate knowledge of the details of expense, it is easy to make mistakes that will be wasteful instead of the contrary.

A CANADA man tied his dog to the rear car of a train, and then bet the beast could keep up with it. Strange to say, when the train reached Detroit, the dog was a-head—there was nothing else left of him.

A PEORIA lady takes the train in this wise : She comes down to the depot in an express-wagon three hours before train time. She insists on sitting on her trunk, out on the platform, to keep it from being stolen. She picks up her reticule, fan, parasol, lunch-basket, small pot, with a house-plant in it, shawl, paper bag of candy, bouquet, small tumbler, and extra vail, and chases hysterically after every switch-engine that goes by, under the impression that it is her train. She asks everybody in the depot and on the platform when the train will start and where it will stand, and looking straight at the great clock, asks, "What time is it now ?" Although the first at the depot, she is the last to get her ticket, and once on the cars, she sits to the end of her journey in an agony of apprehension that she has got on the wrong train and will be landed at some strange station, put in a close carriage, drugged, and murdered. She finally recognizes her waiting friends on the platform, leaves the car in a burst of gratitude, and the train is ten miles away before she remembers that her reticule, fan, parasol, lunch-basket, verbena, shawl, candy, tumbler, vail, and bouquet are on the car-seat where she left them, or in the depot at Peoria, for the life of her she can't tell which.

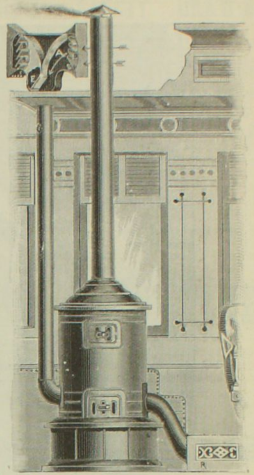


Fig. 2.

Railway Association Conventions.

June 11.—Yardmasters' Mutual Benefit Association at Atlanta, Ga. Secretary, Joseph Sanger, Indianapolis.

June 10.—Master Car-Builders' Association. Annual Convention. At Saratoga Springs, N. Y. Secretary, M. N. Forney, 71 Broadway, N. Y.

June 18.—American Railway Master-Mechanics' Association. At Long Branch, N. J. Secretary, J. H. Setchel, Cincinnati.

September 3.—Master Car-Painters' Association. At Boston. Secretary, R. McKeon, Kent, Ohio.

October 15.—American Street Railway Association. At New York. Secretary, J. W. Richardson, Brooklyn, New York.

October 22.—Association of American Railroad Superintendents. Semi-Annnal Convention. At Washington D. C. Secretary, Waterman Stone, Providence, R. I.

January, 1885.—National Association of General Baggage Agents. At Boston. Secretary, W. B. Starring, Chicago.

Western Railway Club.

This club, whose preliminary organization and constitution we have published, has permanently organized by the election of the following officers: B. K. Verbryck, Chicago, Rock Island & Pacific, President; H. S. Bryan, Chicago & Iowa, Vice-President; William Forsyth, Chicago, Burlington & Quincy, Secretary; W. B. Snow, Illinois Central, Treasurer.

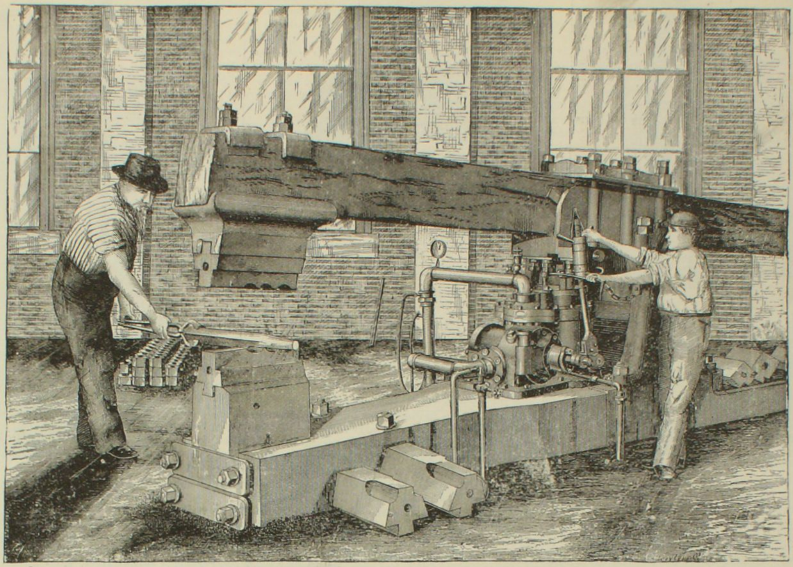
A committee, consisting of William Forsyth, H. S. Bryan and W. B. Snow, has been appointed to prepare an essay on best material for and construction of car roofing, to be discussed at the next meeting. The club meets the third Wednesday of each month at 103 Adams street, Chicago.

MR. A. C. ARMSTRONG, Purchasing Agent of the Lake Shore & Michigan Southern Railway, has for sale a number of second-hand locomotives at prices which should attract the attention of purchasers. They are in good order and have been built by different manufacturers.

THE noise caused by trains passing over bridges has been prevented in Germany by making the rails long enough to reach the entire length of the bridge, so there will no rail joints on it—the noise being due to the violent vibration at the joints. The longest rails that have been made for this purpose, however, are only 88½ feet.

WHEN the trains began to run on the New York City elevated roads, some six years ago, a great outcry was raised by the owners and tenants of buildings, and also by church congregations contiguous to the tracks, on account of the noise made by passing trains. A great many plans were proposed for deadening the sound, some of which were tried and proved partially successful. But after a short time they were all abandoned, and the rails now rest directly on the cross-ties, the same as upon surface roads. The people, like the horses, have become accustomed to the noise and think nothing of it.

A LAS VEGAS (N. M.) paper says that the Atchison, Topeka & Santa Fe Co. have executed a contract for the erection, at Las Vegas, of very extensive wood-preserving works. They are to use the Line-Tonnier chemical process, which is owned and operated by the St. Louis Wood Preserving Company. This process was awarded the "gold medal" at the National Exposition of Railway Appliances, at Chicago, as the best process for preserving wood, cross ties and timber. This company has been using the New Mexican pine, but until treated, it is not particularly lasting. After being subjected to this chemical process, it is said to be very superior timber.



ONE-THOUSAND-POUND STEAM HELVE-HAMMER.

Book Notice.

Hudson's Tables for Calculating the Cubic Contents of Excavations and Embankments. By John R. Hudson, C. E. John Wiley & Sons, 15 Astor Place, New York.

This work contains 24 tables for the calculation of excavations, embankments, etc., by an improved method of diagonals and side triangles which has all the accuracy of the prismoidal fortmulas. Some of the advantages of the use of a table of side triangles are, that the irregular cross-section can be calculated nearly as quickly as those for level ones, with a greatly reduced liability for error. The error in the use of this method is common to all others, and arises from the fact that the ground is not a plane surface, but is warped. The method of the author, however, has the advantage that the surface between any two cross-sections is divided into four planes, and the error is reduced one-quarter. The tables are well printed and the figures are large, an advantage which those who have many tables to use will appreciate. Blank lines divide the columns into periods of five vertically.

GOODELL & WATERS, of Philadelphia, manufacturers of Wood Working Machinery, have issued a new illustrated catalogue for 1884, containing full descriptive details of the various classes of machines in their line, including a long list of planers, many of which are already well known in the market, while others have new and improved features of construction the merits of which are deserving of special attention. The catalogue embraces the usual variety of molding, mortising, tenoning and boring machines, improved band-saws, shafting and appliances for the transmission of power. A system of gauges and templets has been perfected by this firm so that parts of machines of the same class are made interchangeable, an advantage that will be appreciated by all mechanics, and especially by those who are at a distance from repair shops. Duplicates of parts that will fit accurately can in most cases be furnished at the shortest notice. The catalogue contains 111 pages (11½ by 9 inch) and will be found extremely useful to mill owners and other users of machinery and especially to parties who contemplate purchasing wood working tools. Copies of it will be furnished on application to the firm, 3101 Chestnut street, Philadelphia.

THE Babcock & Wilcox Co., of New York, manufacturers of water tube steam boilers, have placed with Leishman & Snyder, of Pittsburg, an order for 500 tons of open hearth steel, each plate of which must have attached to it a coupon showing a tensile strength of 55,000 to 60,000 lbs., with 20 per cent. elongation in 8 inches, and to stand bending double both before and after being heated and plunged into cold water, without showing any cracks, and the analysis not to show more than 1/10 of 1 per cent. phosphorus. Steel to be branded and stamped 60,000 lbs. T S.

The Universal Automatic Freight Car Coupler Manufacturing Co., of South Orange, N. J., solicit correspondence regarding their devices patented April, 1884. The only practical link-and-pin drawhead yet invented, coupling with a slack of less than 2½ inches. Wonderfully simple, very cheap, durable and effective. No more lost or stolen links or pins. Pronounced "perfect" by the most experienced manufacturers of railway appliances. On exhibition at 113 Liberty street, New York, and now in use. Send for circular to the company at South Orange, as above.

The engraving represents one of the smaller steam helve-hammers built by the Cuyahoga Steam-Furnace Co. of Cleveland, Ohio. The larger hammers built by this well-known firm have for many years been used in the various steam-forges of the country for making all kinds of iron and steel forgings, from the ordinary car-axles up to shafts from ten to twenty-six inches in diameter. The hammer shown is designed especially for use in large blacksmith-shops connected with machine-shops, railroad repair-shops, bridge-works, and all places where the work done is heavy enough to require a steam-hammer. The steam-cylinder is 16 inches bore, and the stroke varies from 1 to 8 inches, but as most of the work is done on a stroke of 3 or 4 inches of the piston, the amount of steam required to work it is very small, no steam being used on the down stroke. In steam-hammers it is of the utmost importance that the admission as well as the release of the steam should be as rapid and free as possible; and this is accomplished in this hammer by reason of its having very long steam and exhaust ports. In the "Cuyahoga" hammer the slide-valve, by a peculiar arrangement of its own, is relieved of a large share of the steam pressure, and consequently of the friction it otherwise would have. While the peculiar action of a helve imparts a motion to the hammer-head somewhat akin to that of a hand-hammer or sledge, and its blow is quite different in its effect from that obtained by a simple drop, the greater advantage it possesses is that, by its use, all framings or housings about the anvil-block are done away with, and the work can be brought to the anvil from either side. This is particularly useful when the hammer is wanted for welding long-eye or other bolts, or bars of any kind; as, when the work is completed, it can readily be moved out at the end of the die, instead of having to be drawn its whole length from between the housings. Another of the marked advantages possessed by the helve over the upright hammer is, that it admits the use of a much longer die upon the anvil-block; and in the hammer-head this is of great advantage in making swage work of any kind where there are collars to be forged on, where a portion of the work is to be of different diameter, or where a portion of it is made tapering. The long die gives room for grooves of different shapes or sizes, and thus the work can be finished on one die and at one heat. The valve gear used is very simple, and the hammer can readily be handled by a boy. It can be made to give one or more strokes, light or heavy, as they may be wanted, and without stopping the hammer to adjust the valve gear. The hammer is strong and substantial, complete in itself, and only requires a simple foundation of timber, and the steam and exhaust pipes, to be ready for use. It will be apparent to any one conversant with steam hammers, that the use of the wood helve between the piston and the hammer-head does away with all shocks, which in an upright hammer tend so rapidly to crystallize the working parts, and which make broken piston-rods a not infrequent occurrence.

Our Directory.

We note the following changes since our last issue. Our readers will do us a great favor by giving us prompt notice of any changes that may come to their knowledge or of any errors that may be noticed in our list.

Allegheny Valley.—William A. Wood has been appointed Master Mechanic of this road, dating from April 14, 1884. His office will be at Verona Shops. Mr. Wood succeeds Mr. G. W. Glass, deceased.

Buffalo, New York & Philadelphia.—J. W. Watson, Superintendent of the Narrow Gauge Division, has been appointed Superintendent of the Rochester Division also, in place of Mr. R. M. Patterson, who has gone to the Lackawanna & Pittsburgh road.

Credit Valley.—D. Preston is Mechanical Superintendent, vice H. G. Taylor. This road is operated by the Ontario & Quebec Railway.

Florida Railway & Navigation Co.—This is the name of the company formed by the consolidation of the Florida Transit & Peninsular, the Fernandina & Jacksonville, and Florida Central & Western roads, and by which they are known and operated.

Hannibal & St. Joseph.—J. F. Barnard, formerly General Superintendent of the Kansas City, St. Joseph & Council Bluffs road, has been appointed General Manager.

Indiana Illinois & Iowa.—R. C. Ackley is appointed Master Mechanic, with office in Kankakee, Ill., in place of T. W. Newell, resigned.

Lehigh & Hudson River.—N. L. Furman has been appointed Superintendent, vice W. L. Anderson, resigned.

Mexican Central.—D. Mackenzie is General Superintendent, and F. W. Johnstone, Superintendent of Motive Power and Machinery, with headquarters in the City of Mexico. 1st Division, G. T. Jarvis, Superintendent; 2d Division, J. H. Smith, Superintendent; 3d Division, Wm. Davis, Superintendent; 4th Division, R. E. Comfort, Superintendent.

Michigan Central.—Robert Miller, who has been for many years Master Car-Builder of this road, has been appointed Assistant General Superintendent.

North Pacific Coast.—E. L. Reese has been appointed Master Mechanic at Sancelito, vice J. Taylor.

Rochester & Pittsburgh.—J. P. Hovey has been appointed Superintendent of Motive Power and Machinery. Appointment to take effect May 1.

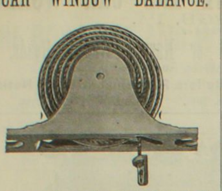
THE VULCANIZED FIBRE CO., of Wilmington, Del., announces that the Gelatinized Fibre Co., heretofore manufacturing fibre goods in Brooklyn, N. Y., has been consolidated with the Vulcanized Fibre Co., and that hereafter all goods of the consolidated companies will be manufactured at the works in Wilmington, Del.

WANTED.—A position as Master Car-Builder, or Foreman in a Locomotive Machine Shop or Car Works, by a first-class machinist who has had ten years' experience in the building of locomotive engines and railway cars. Good references furnished. Address NATIONAL CAR-BUILDER, Morse Building, New York, N. Y. 2 t.

FOR SALE.

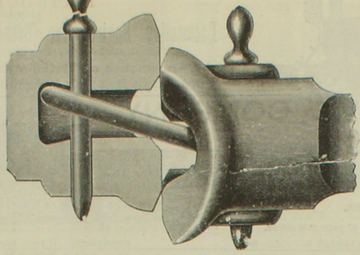
Three first-class Sleeping Cars, fully equipped with the latest improvements. They will be sold at prices that will be an inducement to buyers. Address NATIONAL CAR-BUILDER, Morse Building, New York.

"CAR WINDOW BALANCE."



For Passenger Coaches, Sleeping and Parlor Car Windows, consisting of Cone and Coil Spring with wire cord, balancing the weight of sash; noiseless in operation and placed entirely out of sight. Adopted by many of the leading roads. No car complete without them.

O. K. GARDNER, Manufacturer,
28 and Railroad Sts., Pittsburgh, Pa.



SAFFORD'S SAFETY DRAW-BAR

"VICTORY OVER MORE THAN 30 CONTESTANTS."

Victory over more than 30 Self-Couplers in the Master Car-Builder's Convention of June, 1876. Also indorsement for safety in coupling by the Yard Masters, in their Convention, June, 1877, and by 300 others who were unable to attend the Convention, and 300 railroad officials who are resident in 26 States, and who admitted superiority over any other yet produced. Try 30 free of royalty, and see for yourself! Pattern free, and no change in timbers or connections. Those made by Wilson, Walker & Co., Pittsburgh, Pa., *will save 200 per cent. in repairs*, and give double life service over *old styles of* wrought iron. About 43,000 in use by 146 railroads. The *saving in repairs* by using *my invention* is from 20 per cent. to 80 per cent. as per *report of many officers.*

J. B. SAFFORD,
EAGLE IRON WORKS
BUFFALO, N. Y.

WOLFRATH'S COMBINATION SASH LIFT AND AUTOMATIC FASTENER.

Sash can be raised or lowered to any desirable height. Cannot drop. Approved and adopted by practical Railroad men.

Address, NEW YORK CAR FITTINGS CO., 82 DREXEL BUILDING, NEW YORK CITY.

JOHN W. MASURY & SON,

MAKERS OF STRICTLY FIRST-CLASS

Railway Varnishes,

AND MANUFACTURERS OF

CAR BODY COLORS.

By permission, we refer to the following Companies, for whom we have made Special Colors:

PENNSYLVANIA RAILROAD CO., Enoch Lewis, Purchasing Agent, Philadelphia, Pa.
PENNSYLVANIA CO., Wm. Mullins, General Purchasing Agent, Pittsburg, Pa.
BALTIMORE & OHIO RAILROAD CO., N. S. Hill, Purchasing Agent, Baltimore Md.
CHICAGO & ALTON RAILROAD CO., A. V. Hartwell, Purchasing Agent, Chicago, Ill.
CHICAGO & NORTHWESTERN RAILROAD CO., R. W. Hamer, Purchasing Agent, Chicago, Ill.
LEHIGH VALLEY RAILROAD CO., L. Chamberlin, Purchasing Agent, Philadelphia, Pa.
NORTHERN RAILROAD OF CANADA, F. W. Cumberland, Superintendent, Toronto, Ont.
NAUGATUCK RAILROAD CO., G. W. Beach. Superintendent, Waterbury, Conn.
PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD CO., R. N. Dowd, Commissary, New Haven, Conn.

UNION PACIFIC RAILROAD CO., } A. D. Clark, Purchasing Agent, Omaha, Neb.
KANSAS " " }
CHICAGO, BURLINGTON & QUINCY RAILROAD CO., Wm. Irving, Purchasing Agent Chicago, Ill.
LOUISVILLE, CINCINNATI & LEXINGTON RAILROAD CO., Wm. Mahl, Purchasing Agent, Louisville, Ky
GRAND TRUNK RAILWAY N. Wall, Port Huron, Mich.
LITTLE ROCK & FORT SMITH RAILROAD CO., T. Hartman, Purchasing Agent, Little Rock, Ark.
GILBERT & BUSH CO., Troy, N. Y. }
WASON MANUFACTURING CO., Brightwood, Mass. }
BILLMEYER & SMALL MANUFACTURING CO., York, Pa. } Railroad Car Builders.
JACKSON & SHARP CO., Wilminton, Del. }
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The advantages derived from the use of such Special Colors are many, a few of which are found below:

ABSOLUTE UNIFORMITY OF SHADE. DURABILITY, as we use perfectly pure materials. **SAVING OF MONEY,** because of small quantity required. **SAVING OF TIME,** in the putting on of the same. **SAVING OF LABOR AND MATERIAL,** as no extra amount of Varnish will be required to hide a sanded surface **LARGER DEGREE OF CERTAINTY** that there will be an absence of cracked work, as our mixtures are all uniform, being done by weight only.

We make any desired shade, it only being necessary that purchasers furnish us with sample of color desired, stating the time they would like to have the paint dry in.

We shall be glad to furnish samples and give prices to any who may wish to avail themselves of the above advantages.

Very respectfully

JOHN W. MASURY & SON, New York and Chicago.

Established 1856.

Shipman & Bolen, Manufacturers of fine Railway Varnishes,

No. 352 Mulberry St., Newark, New Jersey.

BILLINGS, TAYLOR & CO.,

(INCORPORATED.)

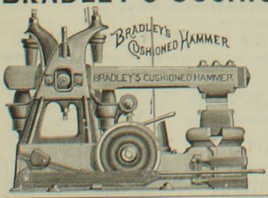
Color Makers,

AND MANUFACTURERS OF

COACH AND CAR COLORS AND FINE VARNISHES.

N. Y. Office, 105 John Street. CLEVELAND, OHIO.

BRADLEY'S CUSHIONED HAMMER



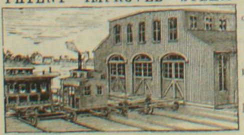
STANDS TO-DAY
WITHOUT AN EQUAL.
OVER 800 IN USE.

It approaches nearer the action of the smith's arm than any hammer in the world.

BRADLEY & CO.,
Syracuse, - - N.Y.
(Established 1832.)

Heating Forges for Hard Coal or Coke.

ROBINSON'S PATENT IMPROVED STEAM POWER TRANSFER TABLE.



Only two men required to handle the table and cars.

Tables Built to Order.

Power Applied to Tables Now in Use.

Awarded Silver Medal at the National Railway Exposition, Chicago, 1883.

N. W. ROBINSON, Mechanical Engineer.
ROOM 408, FIRST NATIONAL BANK BUILDING,
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MALLEABLE IRON CASTINGS

CASTINGS FOR RAILWAY AND CAR-BUILDERS A SPECIALTY.

DAYTON MALLEABLE IRON CO, DAYTON, O.

MAKE

ORDERS AND CORRESPONDENCE SOLICITED.

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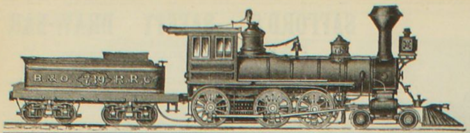
LOCOMOTIVES.

18 BROADWAY (Welles Building), NEW YORK.



PITTSBURGH LOCOMOTIVE AND CAR WORKS,

PITTSBURGH, PA.

MANUFACTURERS OF

Locomotive Engines for Broad or Narrow Gange Roads,

From standard designs, or according to speci ations, to suit purchasers.

Tanks, Locomotive or Stationary Boilers Furnished at Short Notice

D. A. Stewart, Prest. D. A. Wightman, Supt. Wilson Miller, Sec. & Treas.

HINKLEY LOCOMOTIVE COMPANY,

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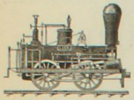
MANUFACTURERS OF

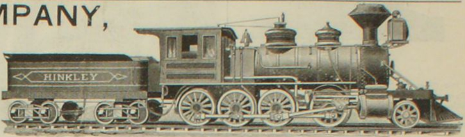
LOCOMOTIVE ENGINES

FOR ALL GAUGES.

Best workmanship and interchangeability of parts guaranteed.

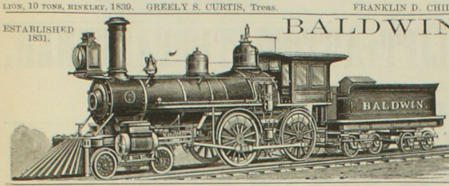

LION, 10 TONS, HINKLEY, 1839.

GREELY S. CURTIS, Treas. FRANKLIN D. CHILD, Supt.



CONSOLIDATION, 52 TONS, HINKLEY LOCOMOTIVE COMPANY, 1882.

ESTABLISHED 1831.



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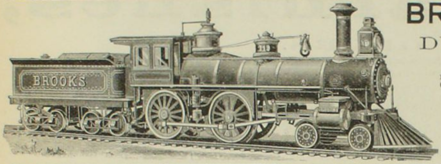
Adapted to every variety of service, and built accurately to standard gauges and templates. Like parts of different engines of same class perfectly interchangeable.

Passenger and Freight Locomotives, Mine Locomotives, Narrow Gauge Locomotives, Steam Street Cars, etc. Illustrated Catalogues furnished on application of customers. All work thoroughly guaranteed.



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Orders Solicited for Locomotives Adapted for Every Class of Railway Service.

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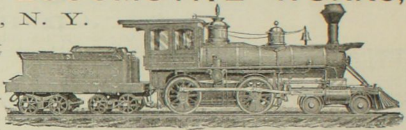

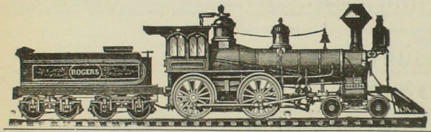

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New York Office, 44 Exchange Place.

Manufacturers of Locomotive Engines and Tenders and other Railroad Machinery

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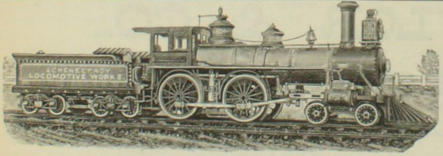

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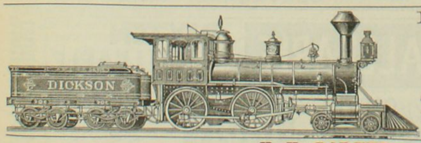
SCHENECTADY, N. Y.



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Scranton and Wilkes-Barre, Pa.,

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LOCOMOTIVES FOR EVERY KIND OF SERVICE.

The different classes constructed according to standard gauges and templets, so that like parts are interchangeable and may be ordered by number.

MINING, HOISTING and PUMPING MACHINERY a specialty. Car Wheels, Forgings, and Machinery of all kinds. Specifications and plans furnished on application. General Office, Scranton, Pa.

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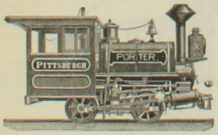

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H. K. PORTER & CO.,

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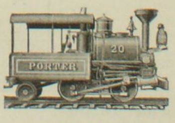

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Builders of all Kinds of

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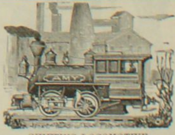
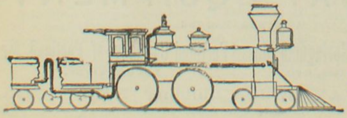
Locomotives.

Send for Catalogue.


SHIFTING LOCOMOTIVE.

THE ASHTON VALVE COMPANY,

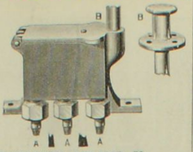
271 Franklin Street, Boston, Mass.



The Ashton Blow-back Safety-valve is constructed so as to conduct the escape steam which is blown off back o the tender, or to the smoke-box and up the chimney. By this arrangement the heat of the escape steam, instead of being wasted as it is when an ordinary safety-valve blows off, is communicated to the cold water in the tender. This not only results in an important economy, but it renders the escaping steam noiseless, and the increase of temperature of the water h s a tendency to deposit some of its impurities before it is pumped into the boiler. It thus *stops the noise! saves fuel! and al. engines steam better and faster, and do more effective work with these valves* than with those in ordinary use.

Campbell's Automatic Oiler for Locomotives,
FOR OILING AUTOMATICALLY
THE BOX, SHOE AND WEDGE
OF LOCOMOTIVES.

L. B. FLANDERS MACHINE WORKS,
PEDRICK & AYER, Proprietors,
1025 Hamilton Street, Philadelphia, Pa.
CIRCULARS AND PRICES ON APPLICATION.



☞ WE REFER, BY PERMISSION, TO THE PENNSYLVANIA RAILROAD CO.

Office of Fire Marshal, Cincinnati, O., Feb. 28, 1884.

The Cincinnati Corrugating Co., Cincinnati, Ohio:

Gentlemen—My experience fully sustains the justice of the fire laws of Cincinnati and the usage of the Insurance Companies doing business in our City, viz.: In ranking CORRUGATED SHEET IRON with Brick or Stone for practical efficiency against fire.

Yours truly,
(Signed), JOSEPH BUNKER,
Fire Marshal.

FULTON IRON AND ENGINE WORKS,
DETROIT, MICH.
HOPKINS' LEAD LINED BEARINGS
CLAMER'S AJAX JOURNAL METAL.
FULTON'S SPECIAL BRONZE BOXES, FOR PASSENGER CARS.
Bronze Journal Metal, for Freight Cars.
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TRADE MARKS: "Phosphor-Bronze."

PHOSPHOR-BRONZE,
For Bearings of Locomotives, Cars and Machinery,
SLIDE VALVES, CYLINDER RINGS AND STEAM CONNECTIONS.
SAVES OIL AND REPAIRS, PREVENTS DELAY TO TRAINS, AND NEVER CUTS THE JOURNALS.
Pamphlets and particulars on application to
THE PHOSPHOR-BRONZE SMELTING CO., Limited,
Office, 512 Arch Street, Philadelphia, Pa.
Owners of the United States Phosphor-Bronze Patents. Sole Manufacturers of Phosphor-Bronze in the United States

Phosphor Bronze

THE HENRY-BELL PAINT REMOVER! FULLY TESTED.
Time, Money and Danger Saved to Railroads and Coach Painters.

For removing old Paint or Varnish from Woodwork, Iron, Glass, etc., *without the use of Fire, Hot Irons, or Scrapers.* Does its work *neat, cheap and rapid. Does not raise the grain of the wood or injure the fabric operated upon. Does its work in less than an hour, 60 minutes.* Can be repainted at once as nicely and effectually as when originally primed. Does away with the use of *Fire, Hot Irons or Scrapers.* Does not injure the workman. Applied with an ordinary paint brush upon any surface which can be painted. Will not run. After old paint is softened it is easily removed by water. One gallon of compound will remove all the paint or varnish on a square (10 × 10 feet). Price list sent on application. Reasonable discount to the trade. Orders, correspondence and tests solicited. Manufactured and sold only by

BELL & HENRY, Platteville, Wisconsin, U. S. A.

EAMES VACUUM BRAKE CO.

RAILWAY TRAIN POWER BRAKES
BEST IN THE WORLD.
WATERTOWN, NEW YORK.

THE EAMES BRAKE is confidently offered as the most efficient, simple durable and the cheapest power Brake in the market. Can be seen in operation upon over 120 roads, and notably the N. Y. Elevated R.R., where it daily makes 69,277 stops.

DAMASCUS BRONZE,
Formerly Manufactured by the WESTINGHOUSE MACHINE CO., now made exclusively by the Damascus Bronze Company for BEARINGS for Locomotives, Cars and Machinery.
We would call the attention of Master Mechanics and Master Car-Builders to our
PEERLESS BEARING METAL,
Claiming it to have more Anti-Friction qualities and to be more durable than any Bronze or Brass on the Market.
The Metal is for Sale Either in Ingot or Castings.
DAMASCUS BRONZE COMPANY, PITTSBURGH, PA.

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Rolling Stock, New and Second Hand.
Steel Rails and Fastenings. General Line Equipments.
Iron Ship and Bridge Building Materials.
Steel Boiler, Bridge and Ship Plates. Angles and Beams.

ANSONIA BRASS AND COPPER CO.,
MANUFACTURERS OF
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SHEETS, BOLTS, RODS,
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REFINED INGOT COPPER
"ANCHOR" AND "STAR" BRANDS.
19 AND 21 CLIFF STREET, NEW YORK.
Factories at Ansonia Conn.

Boiler,
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STEELS.
Quality Unsurpassed. Plates up to 100 inches in width.

FIRE BOX STEEL.

Purity, Ductility and Softness.

SHOENBERGER & CO.,
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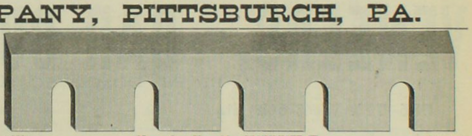

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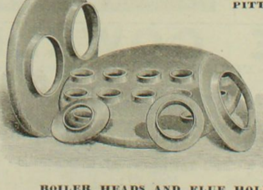
Manufacturers of MACHINE KNIVES, PLANING, TENONING, Etc.
All Kinds Machine Cutters to Pattern. **BUFFALO, NEW YORK.**

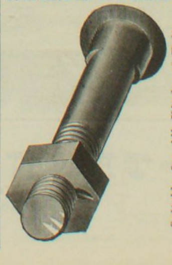
SLIGO ROLLING MILLS.
PHILLIPS, NIMICK & CO.,
PITTSBURGH, PA.,
MANUFACTURERS OF
"Sligo" Boiler Plate and Fire-Box Iron.
"Sligo" Bar, Band, Sheet and Angle Iron.
"Sligo" Stay Bolt Iron,
Used by the Principal Railroads in the United States, and Warranted Unexcelled.
"TYRONE" BRAND BAR, SHEET, TANK PLATE & ANGLE IRON.
Quality our Specialty.
BOILER HEADS AND FLUE HOLES FLANGED TO ORDER.
SEND FOR PRICE-LIST.



W. D. WOOD & CO.'S
Limited,

PATENT PLANISHED SHEET IRON.
Patented March 14, 1865; April 8, 1873; Sept. 9 1873; Oct. 6, 1874; Jan. 11, 1876.
Guaranteed fully equal, in all respects, to the
IMPORTED RUSSIA IRON,
And at a much less price.
LOCOMOTIVE JACKET IRON
Our Specialty.
For sale by all the principal Metal Dealers in the large cities throughout the United States, and at their office,
111 Water Street, Pittsburgh, Pa.

THE DEED NUT LOCK
THE ONLY
COMPLETE and UNIVERSAL NUT LOCK.

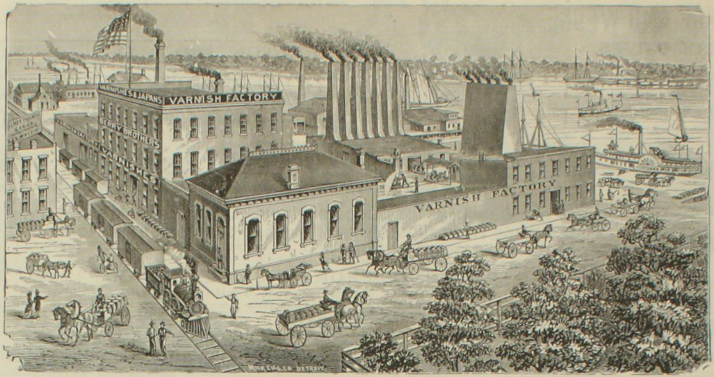


Suitable for All Kinds of Bolts.
CAN BE REMOVED WITHOUT INJURY TO EITHER BOLT OR NUT.
DEEDS NUT LOCK CO., Terre Haute, Ind.
WM. MACK, Pres. JOHN T. SCOTT, Gen. Man

BERRY BROTHERS, DETROIT, MICH., MANUFACTURERS OF **RAILWAY VARNISHES.**

ESTABLISHED IN 1858.
USE BERRY BROTHERS'
RAILWAY VARNISHES.

Frontage on Wight Street, 218 ft.



Frontage on Lieb Street, 200 ft.

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RAILWAY VARNISHES.
ESTABLISHED IN 1858.

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(Via New Orleans),

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MANUFACTURERS OF
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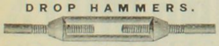
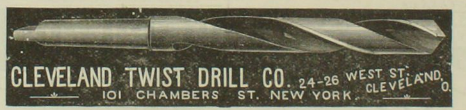


DROP FORGED.
Brooklyn, N. Y.

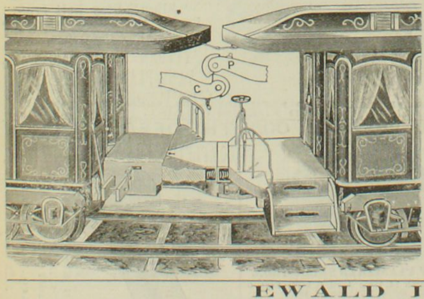


CLEVELAND TWIST DRILL CO. 24-26 WEST ST. CLEVELAND, O.
101 CHAMBERS ST. NEW YORK.

BOUND VOLUMES OF THE
NATIONAL CAR-BUILDER
For 1880, 1881, 1882 and 1883.
PRICE $3 EACH.

THE COWELL PLATFORM

Is the only device forming A CONTINUOUS FLOOR between cars in motion, and PREVENTING JERKING in starting and stopping trains.



THE COWELL COUPLING

Is an Improvement on the Miller and Works with it.

"Entire Satisfaction"—"Perfect Satisfaction" are the words used by R. F. Smith, Gen'l Manager Cleveland & Pittsburgh R. R.; Hiram Fowler, Supt. Connecticut Valley R. R.; J. W. Thomas, Gen'l Supt. Nashville, Chattanooga & St. Louis Ry.; J. G. Sawyer, Master Car-Builder same road, and many others.

"The most practical and perfect device in use"—S. L. Bell, an old Conductor Western & Atlantic R. R; G. R. Carr, Gen'l Sup't Columbus, Hocking Valley & Toledo R. R.; J. W. Babcock, for years conductor N. Y, Pa. & Ohio Ry.; Gen P. Pease, of Ohio Central Railway.

"Saving much annoyance to passengers"—Chas. B. Couch, Div. Sup't Lake Shore & M. S. Ry., and others.

"A great improvement over any other device I have seen"—J. H. Tinney, Sup't N. Y. & Greenwood Lake Railway.

"It prevents jerking in starting and stopping trains," say Messrs. Babcock, Bell, Couch, Thomas, Tinney and others.

"A great saving to railroads," say Messrs. Smith. Thomas, Tinney, Fowler, Bell, Babcock, and others.

Refer to the Flint & P. M., Utica I. & Elmira, Cin. Southern, C., N. O. & T. Pacific, W. & A., etc., etc.

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CLEVELAND, O.

EWALD IRON COMPANY,
OWNERS AND OPERATORS OF
—TENNESSEE ROLLING WORKS.—
Tennessee Charcoal Bloom Boiler ate, Flange, Fire Box, Sheet, Bar and Stay-Bolt Iron.
ST. LOUIS OFFICE, - - - - 801 NORTH SECOND STREET.
MANUFACTURE CHARCOAL IRON EXCLUSIVELY.

DIRECTORY

of the Railroads of the United States and Canada, showing the gauge, length of road, number of locomotives and number of cars; and giving the names and titles of their principal officers in charge of the operating, purchasing and rolling stock departments.

A

Adirondack R. R. 4-8½ gauge 60 m. 3 lo. 62 cars.
C. E. Durkee, Supt ....Saratoga, N. Y.
Jacob Myers, M. M ....Saratoga, N. Y.
Jas. J. Traver, M. C. B..........Saratoga, N. Y.
Addison & Northern Penn'a Ry. 3 g. 46 m. 5 lo. 50 c.
F. M. Baker, Gen. Supt..........Addison, N. Y.
Alabama Great So'n R. R. (See Cin., N. O. & T. P.)
Albany & Susquehanna R. R. (See D. & H. Canal Co.)
Albemarle & Raleigh R. R. 4-8½ g. 33 m. 3 lo. 35 c.
Jas. H. Petty, Gen. Supt...... Tarboro, N. C.
Albert Ry. 4-8½ g. 51 m. 3 lo. 35 cars.
G. A. Robinson, Man. & Pur. Agt. Hillsboro, N. B.
Jas. McKay, M. M. & C. B......Hillsboro, N. B.
Alexandria & Fredericksburg Ry. } See Penna. R. R.;
Alexandria & Washington R. R. } (7) Div.
Allegheny Valley R. R. 4-9 g. 259 m. 70 lo. 2202 c.
David McCargo, Gen. Supt. & Pur. Agt.; and
C. B. Price, Supt. (Riv. Div.).....Pittsburg, Pa.
A. A. Jackson, Supt. (L. G. Div.). Reynoldsville, Pa.
W. A. Wood, M. M..............Verona, Pa.
R. Gunning, M. C. B.......... Verona, Pa.
Alliance, Niles & Ashtabula R. R. (See Penna. Co.)
Annapolis & Elk Ridge R. R. 4-8½ g. 20 m. 4 lo. 29 c.
W. H. Bians, Supt. & Pur. Agt..Annapolis, Md.
John L. Beall, M. Mach........ Annapolis, Md.
Antwerp & Paulding R. R. 4-8½ g. 6 m. 4 lo. 63 c.
E. C. Munson, Gen. Man..........Antwerp, O.
William Fitzsimmons, Jr., Pur. Agt. Antwerp, O.
Arizona & New Mexico Ry. 3 g. 71 m. 3 l. 60 cars.
W. H. Jones, Gen. Supt. & P. A. Lordsburg, N. M.
W. C. Boylan, M. M. & M. C. B. Lordsburg, N. M.
Arkansas Midland R. R. 3-6 g. 63 m. 4 lo. 45 cars.
A. H. Johnson, Pr. & Gen. Man...Helena, Ark.
J. B. Johnson, M. M. & M. C. B...Helena, Ark.
Asheville & Spartanburg R. R. 5 g. 49 m. 2 lo. 12 c.
Jas. Anderson, Supt. & Pur. Agt..Spart'b'g, S. C.
M. M........... Spartanburg, S. C.
W. B. Brown, M. C. B.......Spartanburg, S. C.
Ashland Coal & Iron Ry. 4-8½ g. 22 m. 7 lo. 432 c.
Douglas Putnam, Jr., Gen. Supt. Ashland, Ky.
Robt. Peebles, Pur. Agt..........Ashland, Ky.
E. M. Roberts, M. M...........Ashland, Ky.
Ashtabula & Pittsburgh Ry. (See Penna. Co.)
Atchison, Topeka & Santa Fé R. R.
4-8½ g. 2,620 m. 348 lo. 9,629 cars.
A. E. Tonzelain, V. P. & Gen. Man. Topeka, Kan.
Geo. B. Harris, Asst. Gen. Man...Topeka, Kan.
Geo. Hackney, Supt. Mach.......Topeka, Kan.
Clem. Hackney, Asst. Sup. Mach. Dept. do.
Geo. Hargraves, Pur. Agt.... Topeka, Kan.
Eastern Div.: D. J. Chase, Supt. ..Topeka, Kan.
Henry Hull, G. F. Car Dept.....Topeka, Kan.
John Fagan, M. M............Atchison, Kan.
J. M. Smith, M. M.........Kansas City, Mo.
Alfred Taylor, M. M...........Emporia, Kan.
Mid. Div.: H. R. Nickerson, Supt. Nickerson, Kan.
W. Y. Johnson, M. M.......Nickerson, Kan.
......................Dodge, Kan.
W. Div.: D. H. Rhodes, Supt....... La Junta, Col.
A. C. Stiles, M. M........... La Junta, Col.
D. H. Dotterer, M. M............Raton, N. M.
So. Div.: Geo. L. Sands, Supt..... Las Vegas, N. M.
F. B. Woodruff, M. M.....Las Vegas, N. M.
J. H. Holman, M. M...........Wallace, N. M.
E. Hackett, M. M........ San Marcial, N. M.
H. P. Olcott, M. M.........Deming, N. M.
Geo. A. Hancock, M. M.......El Paso, Tex.
Sonora Div.: 265 m.
L. H. Waugh, M. M ....Guaymas, Mex.
Kan. Cy., Law. & So. Kan.
4-8½ g. 399 m. 24 lo. 787 c.
J. L. Barnes, Supt..............Lawrence, Kan.
T. D. Volk, M. M..............Ottawa, Kan.
Atlanta & West Point R. R. (See Western of Ala.)
Atlantic & North Carolina R. R. (See Midland; N. C.)
Atlantic, Tenn. & Ohio R. R. (See Rich. & Dan.; (2) Div.)
Atlantic & Pacific R. R. 4-8½ g. 575 m.
F. W. Smith, G. Supt.........Albuquerque, N. M.
A. G. Thompson, Pur. Agt.....St. Louis, Mo.
Geo. Chalender, Supt. M. P. & M., and
Geo. F. Chalender, A. Supt. Albuquerque, N. M.
Div. Supt............Williams, Ariz.
Augusta & Knoxville R. R. (See Port Royal & Aug.)
Austin & Northwestern R. R. 3 g. 60 m. 5 lo. 75 c.
J. A. Rhomberg, Gen. Man......... Austin, Tex.

B

Bachman Valley R. R. (See Han. Junc., Han. & Gett.)
Balt. & Delaware Bay R. R. 4-8½ g. 50 m. 2 lo. 13 c.
Fred Gerker, Gen. M. & P. A. Chestertown, Md.
Baltimore & Hanover R. R. (See H. J., H. & G.)
Baltimore & Ohio R. R.
4-8½ g. 1,612 m. 574 lo. 17,339 cars.
S. Spencer, 2d V. P. & Gen. Man. Baltimore, Md.
N. S. Hill, Pur. Agt...........Baltimore, Md.
Ohio Riv. Div. 4-8½ g. 972 m.
W. M. Clements, M. of Trans. Baltimore, Md.
A. J. Cromwell, Act. M. of M..Baltimore, Md.
Jno. W. Clark, M. C. B ...... Baltimore, Md.
I. N. Kalbaugh, M. M.........Baltimore, Md.
Wm. Edwards, M. M...Martinsburg, W. Va.
Sam. Houston, M. M.......Piedmont, W. Va.
Robert Maxwell, M. M...... Cumberland, Md.
S. B. Crawford, M. M.........Grafton, W. Va.
Alex. Laird, M. M.......Parkersburg, W. Va.
W. B. McClung, M. M .....Wheeling, W. Va.
Pitts. Div.: T. M. King, Gen. Supt...Pittsburg, Pa.
J. E. Sampsell, Ast. M. of M. Connellsville, Pa.
Trans-Ohio Divs.: G. S. Foreacre, G. Man. Newark, O.
W. H. Harrison, Asst. M. of Mach..Newark, O.
E. L. Weisgerber, M. M..........Newark, O.
H. M. Ingler, M. M................Bellaire, O.
O. B. Perkins, M. M..............Zanesville, O.
Andrew Beckert, M. M..........Sandusky, O.
F. J. Gunther, M. M.....Chicago Junction, O.
Chi. Div.: Gen. Supt ..Chicago, Ill.
Benj. Lowther, M. M............. Garrett, Ind.
W. H. Wilkinson, M. M .... Kingston, Ill.
Baltimore & Philadelphia. 4-8½ g. 20 m. 4 lo. 35 c.
D. Connell, Supt ....Wilmington, Del.
Baltimore & Potomac R. R. (See Penna. R. R.; (7) Div.)
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brown, Supt. & Pur. Agt..Bangor, Me.
C. S. Nason, M. M...............Bangor, Me.
J. W. Comins, M. C. B.......... Oldtown, Me.
Bangor & Portland Ry. 4-8½ g. 25 m. 3 lo. 3 c.
C. Miller, Pres................ Blairstown, N. J.
Barclay R. R. 4-8½ g. 16 m. 6 l. 200 c.
F. F. Lyon, Supt...............Barclay, Pa.
J. A. Hardenburg, Pur. Agt..21 Cort. st., N. Y.
Wm. Johnson, M. M............ Towanda, Pa.
Batesville & Brinkley R. R. 3 g. 25 m. 2 lo. 34 c.
Wm. Black, Pres. & Gen. Supt..Brinkley, Ark.
W. J. Thompson, Gen. Man..Little Rock, Ark.
R. B. Davis, Pur. Agt ....Brinkley, Ark.
Patrick John White, M. M.....Brinkley, Ark.
Baton Rouge, Grosse Tête & Opelousas R. R.
5-6 g. 29 m. 3 lo. 12 c.
D. C. Montan, Gen. Supt.......Port Allen, La.
Bedford & Bloomfield Ry. 3 g. 43 m. 5 lo. 65 cars.
Jas. W. Kennedy, Gen. Supt. & Pur. Agt.; and
Capt. Geo. Elliott, M. M...........Bedford, Ind.
Richard G. Elliott, M. C. B.......Bedford, Ind.
Bellaire, Zanesville & Cin. Ry. Co. 3 g. 42 m. 5 lo. 71 c.
S. L. Mooney, Gen. Supt........Woodsville, O.
J. B. Hong, M. M......................Bellaire, O.
Bell's Gap R. R. 4-9 g. 23 m. 4 lo. 148 cars.
R. G. Ford, Supt..........Bellwood (P. O.), Pa.
Geo. Van Brunt, M. M ....Bellwood, Pa.
A. Zimmerman, M. C. B..........Bellwood, Pa.
Belt R. R. 4-8½ g. 12 m. 10 lo.
W. P. Ijams, Supt ....Indianapolis, Ind.
Bennington & Rutland Ry. 4-8½ g. 59 m. 10 lo. 236 c.
F. C. White, Supt. & Pur. Agt..Bennington, Vt.
G. W. Blanchard, M. M..............Rutland, Vt.
Berlin Branch R. R. (See Han. Junc., Han. & Gett.)
Bingham, Canyon & Camp Floyd (See Den. & Rio Gr.)
Bladen, Columbus & Florida. 4-8½ g. 16 m. 2 lo. 2 c.
John Colville, Pres...........Wilmington, N. C.
Bodie Lumber Co. 3 g. 34 miles.
Thomas Holt, Supt. & Pur. Agt.....Bodie, Cal.
E. M. Luckett, M. M. & C. B.........Bodie, Cal.
Boston, Barre & Gardner. 4-8½ g. 37 m. 8 lo. 108 c.
H. H. Marshall, Supt. & P. A..Worcester, Mass.
Frank I. Goodwin, M. M.... Worcester, Mass.
Boston, Concord, Montreal & White Mts. R. R.
4-8½ g. 167 m. 40 lo. 1,116 cars.
W. A. Stowell, Supt...........Plymouth, N. H.
Geo. W. Storer, Pur. Agt..........Boston, Mass.
R. Adams, M. M..... Lake Village, N. H.
G. A. Ferguson, Asst. M. M...Lake Village, N. H.
L. D. Pickering, M. C. B....Lake Village, N. H.
Whitefield & Jefferson Div.:
A. L. Brown, Supt..........Whitefield, N. H.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 87 m. 18 lo. 1,038 cars.
H. L. Morrill, Gen. Man..Mechanicsville, N. Y.
C. H. Cory, Pur. Agt.....Mechanicville, N. Y.
C. H. Cory, Supt. & M. M..Mechanicville, N. Y.
John S. Ellis, M. C. B......Mechanicville, N. Y.
Boston, Revere Beach & Lynn R. R. 3 g. 9 m. 7 lo. 46 c.
C. A. Hammond, Supt. & P. Agt. Boston, Mass.
R. D. Sutherland, M. M..........Boston, Mass.
John Coghlan, M. C. B..........Boston, Mass.
Boston, Winthrop & Point Shirley R. R.
3 g. 10 m. 1 lo. 8 c.
C. A. Parks, Supt..............Boston, Mass.
J. W. Davis, M. M..............Winthrop, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 245 lo. 6,111 c.
W. H. Barnes, Gen. Supt..........Boston, Mass.
E. Gallup, Asst. Supt.........Springfield, Mass.
A. B. Underhill, Supt. M. P...Springfield, Mass.
F. D. Adams, Gen. M. C. B.......Allston, Mass.
H. B. Chesley, Div. Supt........Boston, Mass.
G. H. Colby, Div. M. M ....Boston, Mass.
C. E. Grover, Div. Supt....Springfield, Mass.
H. W. Eddy, Div. M. M....Springfield, Mass.
J. B. Weston, For. Car Sh. Springfield, Mass.
W. H. Russell, Jr., Div. Supt. E. Albany, N. Y.
T. B. Purvis, Div. M. M...East Albany, N. Y.
J. E. Doran, For. Car Sh..East Albany, N. Y.
Boston & Lowell R. R.
4-8½ g. 140 m. 82 lo. 2,565 cars.
C. S. Mellen, Supt..............Boston, Mass.
F. H. Nourse, Pur. Agt...........Boston, Mass.
J. F. Crockett, Supt. T. & Mach..Boston, Mass.
Boston & Maine R. R. 4-8½ g. 206 m. 89 lo. 2,209 c.
J. T. Furber, Gen. Supt. & P. A..Boston, Mass.
Geo. J. Fisher, Pur. Agt..........Boston, Mass.
Wm. Smith, M. M..................Boston, Mass.
D. C. Richardson, M. C. B.....Lawrence, Mass.
Boston & N. Y. Air Line R. R. (See N. Y., N. H. & H.)
Boston & Providence R. R. 4-8½ g. 67 m. 52 lo. 1,006 c.
A. A. Folsom, Gen. Supt. & P. A. Boston, Mass.
Geo. Richards, M. M..........Roxbury, Mass.
Jno. Lightner, M. C. B.........Roxbury, Mass.
Bowling Green R. R. 4-8½ g. 6 m. 2 lo. 4 c.
Wm. A. Wiggins, Gen. Man. Bowling Green, O.
Wm. A. Wiggins, Pur. Agt..Bowling Green, O.
Bradford, Bordell & Kinzua R. R. 3 g. 42 m. 6 lo. 82 c.
Bradford, Eldred & Cuba. 3 g. 54 m. 6 l. 158 c.
Tonawanda Valley & Cuba. 3 g. 60 m. 5 lo. 31 c.
B. C. Williams, Gen. Man. & P. A..Brad'fd, Pa.
Jno. Delaney, M. M. & C. B......Bradford, Pa.
Brattleboro' & Whitehall R. R. 3 g. 36 m. 3 lo. 56 c.
(Operated by Central Vermont.)
Breakwater & Frankford R. R. (See Del., Md. & Va.)
Bridgton & Saco River R. R. 2 g. 16 m. 2 lo. 19 c.
Wm. F. Perry, Gen. Supt..... Bridgton, Me.
M. M. Caswell, M. M. & Pur. Agt. Bridgton, Me.
Brighthope Ry. 3 g. 37 m. 4 lo. 193 cars.
Jas. R. Worth, Supt..........Richmond, Va.
P. M. Buckingham, Pur. Agt. Richmond, Va.
A. Gary, Supt. Way & Works. Winterpock, Va.
Robt. Kredell, M. M..........Chester, Va.
Brooklyn, Bath & Coney Island R. R.
4-8½ g. 7 m. 8 lo. 36 cars.
Geo. A. Gunther, Gen. Man...Brooklyn, N. Y.
Aug. Wolff, M. M............Brooklyn, N. Y.
Brooklyn, Flatbush & Coney Island Ry.
4-8½ g. 7 m. 7 lo. 54 c.
J. L. Morrow, Supt. & P. A...Brooklyn, N. Y.
Wm. Finley, M. M...............Brooklyn, N. Y.
Brooklyn & Rockaway Beach R. R.
4-8½ g. 3 m. 2 lo. 18 cars.
Wm. Warner, Supt.....East New York, N. Y.
Brunswick & Western R. R. 5 g. 172 m. 13 lo. 170 c.
H. S. Morse, Gen. Man. & P. A..Brunswick, Ga.
W. R. Kline, M. M...............Brunswick, Ga.
Buff., N. Y. & Phil. R. R. 3 & 4-8½ g. 655 m. 120 l. 6,339 c.
Oliver Watson, Gen. Man.........Buffalo, N. Y.
Geo. S. Gatchell, Gen. Supt..... Buffalo, N. Y.
W. W. Halsey, Asst. to G. Supt. Buffalo, N. Y.
J. H. Poole, Pur. Agt............Buffalo, N. Y.
Allen Vail, Supt. M. P. & M.....Buffalo, N. Y.
Buff. Div.: P. G. Dwyer, Supt......Buffalo, N. Y.
Roch. Div.: J. W. Watson, Supt..Rochester, N. Y.
N. G. Div.: J. W. Watson, Supt......Olean, N. Y.
Riv. Div.: A. Vandivort, Supt....New Castle, Pa.
Pitts. Div.: E. H. Witter, Supt......Oil City, Pa.
H. J. Bookhammer, M. M.........Oil City, Pa.
John Monks, M. C. B.............Oil City, Pa.
C. E. Turner, M. M............... Olean, N. Y.
Burlington, Cedar Rapids & Northern Ry.
4-8½ g. 713 m. 76 lo. 3,006 cars.
C. J. Ives, Gen. Supt.........Cedar Rapids, Ia.
Robt. Williams, Supt ....Cedar Rapids, Ia.
T. Stickney, Pur. Agt........Cedar Rapids, Ia.
R. W. Bushnell, M. M. & C. B. Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 35 m. 4 lo. 64 c.
G. L. Linsley, Gen. Man. & Supt. Burlington, Vt.
F. G. Brownell, M. M., M. C. B. & P. A. do.
Burlington & Mo. Riv. R. R. (in Neb.) (See C. B. & Q.)
Burlington & North-West'n Ry. 3 g. 38 m. 3 lo. 97 c.
Burlington & Western R. R. 3 g. 15 m. 38 c.
W. B. Jones, Supt.............Burlington, Ia.
Burlington & Ohio River R. R. 4-8½ g.
R. Tanner, Pur. Agt...............Chicago, Ill.

C

California Northern R. R. 4-8½ g. 26 m. 2 lo. 17 c.
Andrew J. Binney, Gen. Man..Marysville, Cal.
California Southern R. R. 4-8½ g. 127 m. 13 lo. 301 c.
J. N. Victor, Supt............National City, Cal.
Mech. Supt..National City, Cal.
Cambridge & Seaford. (See Penna. R. R.; (4) Div.)
Camden Atlantic R. R. (See Penna. R. R.; (2) Div.)
Canada Southern Ry. (See Mich. Cen.; (2) Div.)
Canada Atlantic Ry. 4-8½ g. 82 m.
D. C. Linsley, Man...............Ottawa, Ont.
M. Donaldson, M. M .... Ottawa, Ont.
Canadian Pacific R. R. 4-8½ g. 1,742 m. 118 l. 2,726 c.
W. C. Van Horne, Gen. Man....Montreal, Que.
T. G. Shaughnessy, Asst. G. M. Winnipeg, Man.
T. R. F. Brown, Mech. Supt.....Montreal, Que.
T. G. Shaughnessy, Pur. Agt....Montreal, Que.
E. Div.: Archer Baker, Gen. Supt. Montreal, Can.
Tho. Irwin, Mech. Supt.......Brockville, Ont.
W. Div.: J. M. Egan, Gen. Supt..Winnipeg, Man.
F. C. Butterfield, M. M. & M. C. B. Winnipeg, Man.
Cape F'r & Yadkin Val. R. R. 4-8½ g. 112 m. 7 lo. 60 c.
J. S. Morrison, Gen. Supt....Fayetteville, N. C.
Isaac W. Clark, M. M. & C. B..Fayetteville, N. C.
Cape Girardeau Southwestern Ry.
4-8½ g. 33 m. 3 lo. 20 cars.
Louis Houck, Gen. Man..Cape Girardeau, Mo.
W. A. Penney, Gen. Supt..Cape Girardeau, Mo.
W. H. Wheeler, Pur. Agt. Cape Girardeau, Mo.
Fred Glover, M. M........ Cape Girardeau, Mo.
Carolina Central R. R. (See Ral. & Aug.)
Carson & Colorado R. R. (See Va. & Truckee).
Catasauqua & Fogelsville. 4-8½ g. 25 m. 6 lo. 581 c.
C. W. Chapman, Supt. & P. A. Catasauqua, Pa.
J. Thomas, M. M..........Hokendauqua, Pa.
Chas. J. Holbach, M. C. B.... Catasauqua, Pa.
Catskill Mountain R. R. 3 g. 16 m. 2 lo. 26 cars.
Charles A. Beach, Supt ....Catskill, N. Y.
Cazenovia, Canastota & De Ruyter. (See U., I. & E.)
Central and South-Western Railroads (Ga.).
5 g. 1,115 m. 145 lo. 2,008 cars.
W. G. Raoul, Pres..............Savannah, Ga.
Wm. Rogers, Gen. Supt.........Savannah, Ga.
C. H. Carson, Pur. Agt...........Savannah, Ga.
Cen. Div.: D. D. Arden, M. M......Savannah, Ga.
T. F. Warwick, M. M.........Augusta, Ga.
F. Devine, M. C. B..........Savannah, Ga.
So.-West'n Div.: T. D. Kline, Supt ....Macon, Ga.
D. M. Gugel, M. M................Macon, Ga.
James A. Knight, M. C. B....... Macon, Ga.
Central R. R. of N. J. (See Phil. & Read.; N. J. Cen. Div.)
Central R. R. of S. C. (See Wil. & Wel.)
Central American & Pacific Ry. 3 g. 67 m. 1 lo. 11 c.
W. C. Fitzsimmons, Gen. Supt..Escuintla, Guat.
Central Branch Union Pac. (See Mo. Pac.; (3) Div.)
Central Iowa Ry. 4-8½ g. 412 m. 50 lo. 1,959 cars.
E. L. Dudley, Supt...........Marshalltown, Ia.
J. G. Johnston, Asst. Supt....Marshalltown, Ia.
D. D. Phelps, Asst. Supt.........Monmouth, Ill.
W. R. Coppock, Asst. Pur. Agt. Marshalltown, Ia.
John Player, M. M ....Marshalltown, Ia.
T. L. Seevers, M. C. B...... Marshalltown, Ia.
Central Ontario Ry. 4-8½ g. 33 m. 4 lo. 66 cars.
G. W. McMullen, Gen. Man........Picton, Ont.
James Falconar, M. M...........Trenton, Ont.
Central Pac. R. R. 4-8½ g. 4,303 m. 382 lo. 11,260 c.
A. N. Towne, Gen. Man ....San Francisco, Cal.
J. A. Fillmore, Gen. Supt...San Francisco, Cal.
R. H. Pratt, A. G. Supt....San Francisco, Cal.
J. R. Watson, Gen. Pur. Agt..Sacramento, Cal.
A. J. Stevens, Gen. M. M.....Sacramento, Cal.
W. McKenzie, Asst. G. M. M..Sacramento, Cal.
Benj. Welch, Gen. M. C. B....Sacramento, Cal.
G. J. Turner, Asst. G. M. C. B. Sacramento, Cal.
Western; Visalia & Tulare Divs. and Northern Ry.
A. D. Wilder, Supt.........W. Oakland, Cal.
G. D. Welch, M. M. (W. Div.). W. Oakland, Cal.
W. B. Ludlow, M. C. B. (W. Div.) do.
S. Johnson, M. M. (T. Div.).......Tulare, Cal.
D. Rutherford, M. M. (N. Rd.). S. Vallejo, Cal.
Sacramento; Oregon Divs.; and Cal. Pac. R. R.
J. B. Wright, Supt. ....Sacramento, Cal.
M. W. Cooley, M. M. (S. Div.) Sacramento, Cal.
Truckee Div.: J. H. Whited, Supt. Wadsworth, Nev.
Geo. Gregg, M. M......... Wadsworth, Nev.
Wm. McPherson, F. Car Sh..Wadsworth, Nev.
Humb't Div.: G. W. Coddington, Supt. Carlin, Nev.
W. F. Smith, M. M..............Carlin, Nev.
J. C. Doughty, For. Car Sh......Carlin, Nev.
Salt Lake Div.: A. G. Fell, Supt.....Ogden, Utah.
James Lamb, M. M..........Terrace, Utah.
A. Sherburne, For. Car Sh .... Ogden, Utah.
Colorado Div.: C. B. Seymour, Supt. Needles, Cal.
St. & Cop. R. R.: R. L. Myrick, Supt..Stockton, Cal.
Los Angeles; and Yuma Divs. (So. Pac.):
E. E. Hewitt, Asst. Supt....Los Angeles, Cal.
James Velsir, M. M........Los Angeles, Cal.
T. T. Gilieland, For. Car Sh. Los Angeles, Cal.
Arizona Divs. (So. Pac.):
J. A. Muir, Asst. Supt..........Tucson, Ariz.
W. F. Smith, M. M...........Tucson, Ariz.
Rio Grande (S. Pac.) & El Paso (G. H. & S. A.) Divs.:
J. Campbell, Supt..............El Paso, Texas.
J. L. Bonner, M. M...............El Paso, Texas.
H. C. Standish, For. Sh ....El Paso, Texas.
Galveston, Harrisburg & San Antonio Ry.
E. G. Thompson, Supt.......Houston, Tex.
San Anto. Div.: W. G. Van Vleck, Supt., and
J. J. Ryan, M. M............San Antonio, Tex.
Houston Div.; H. Flanders, Supt..Harrisburg, Tex.
D. T. Davis, M. M...........Harrisburg, Tex.
Louisiana Div.: W. Irwin, Supt.....Houston, Tex.
D. C. Smith, M. M..............Houston, Tex.
J. M. Mather, M. C. B. ....Houston, Tex.
El Paso Div.: Jas. Campbell, Supt..El Paso, Tex.
J. L. Bonner, M. M ....El Paso, Tex.
Central Texas & N'w'n R. R. (See Hous. & Tex. Cen.)
Central Vermont R. R. 4-8½ g. 673 m. 136 lo. 2,789 c.
J. W. Hobart, Gen. Man.........St. Albans, Vt.
J. M. Foss, Asst. Gen. Supt. & M. M. St. Albans, Vt.
No. Div.: I. B. Futvoye, Supt.....St. Johns, P. Q.
Rut. Div.: J. Burdett, Supt..........Rutland, Vt.
N. L. Davis, M. M. & C. B....... Rutland, Vt.
Brattleboro & Whitehall R. R., and
Brat. Div.: E. F. Brooks, Supt...Brattleboro, Vt.
New London No'n R. R. 143 m. 22 lo. 303 c.
C. F. Spaulding, Supt. & P. A. New London, Ct.
I. W. Dow, M. M...............New London, Ct.
S. O. Banks, M. C. B.............New London, Ct.
Chagrin Falls & Southern R. R. 3 g. 6 m. 1 lo. 12 c.
W. Hutchings, Gen. Man.....Chagrin Falls, O.
J. W. Williams, Gen. Supt....Chagrin Falls, O.
Charleston & Savannah Ry. 5 g. 115 m. 17 lo. 190 c.
H. S. Haines, Gen. Man......... Savannah, Ga.
C. S. Gadsden, Gen. Supt......Charleston, S. C.
H. A. Ulmo, M. M................ Savannah, Ga.
Charlotte, Columbia & Augusta R. R. (See Rich. & D.)
Chateaugay R. R. 3 g. 34 m. 7 lo. 365 cars.
A. L. Inman, Gen. Man..... Plattsburg, N. Y.
J. M. Davies, Supt......Lyon Mountain, N. Y.
M. L. French, Asst. Supt.... Plattsburg, N. Y.
Chattaroi Ry. 4-8½ g. 51 miles 11 loco. 483 cars.
C. H. Rockwell, Gen. Man. & P. A. Ashland, Ky.
J. R. Martin, M. M............. Ashland, Ky.
Joseph P. Burleigh, M. C. B...... Ashland, Ky.
Cheraw & Chester R. R. (See Rich. & Dan.; (2) Div.)
Cheraw & Darlington R. R. (See Wil. & Wel.)
Cheraw & Salisbury R. R. (See Wil. & Wel.)
Cherokee R. R. (See East & West.)
Cherry Valley R. R. 4-8½ g. 6 m. 3 lo. 6 cars.
E. T. Herndon, Supt................Midland, Mo.
Chesapeake, Ohio & South-Western.
4-9 g. 398 m. 62 lo. 1,345 c.
D. W. C. Brown, Gen. Supt. ....Louisville, Ky.
H. E. Huntington, Pur. Agt.....Louisville, Ky.
J. E. Reeves, Supt. Trans.......Louisville, Ky.
R. H. Briggs, Supt. M. P....Elizabethtown, Ky.
D. L. Weaver, M. M ....Elizabethtown, Ky.
Jno. Fitzgerald, M. M............Paducah, Ky.
Chesapeake & Ohio Ry. 4-8½ g. 642 m. 169 l. 5,120 c.
C. W. Smith, Gen. Man.........Richmond, Va.
D. A. Sweet, Asst. to Gen. Man. Richmond, Va.
A. S. Emmons, Pur. Agt.......Richmond, Va.
T. L. Chapman, Supt. M. P......Richmond, Va.
Eastern Div.: A. H. Wood, Supt..Richmond, Va.
J. N. King, M. C. B............Richmond, Va.
J. B. Pierce, M. M.............Richmond, Va.
Hunt. Div.: W. B. Ryder, Supt.... Hinton, W. Va.
W. H. Thomas, M. M...Huntington, W. Va.
H. C. Bassinger, M. C. B. Huntington, W. Va.
Lex. Div.: J. D. Yarrington, Supt..Lexington, Ky.
S. R. Tuggle, M. M..............Lexington, Ky.
K. C. Div.: G. W. Bender, Supt..Lexington, Ky.
A. H. Watts, M. M .... Lexington, Ky.
Cheshire R. R. 4-8½ g. 80 m. 31 lo. 531 cars.
R. Stewart, Gen. Man..............Keene, N. H.
H. H. Stone, Pur. Agt..............Keene, N. H.
F. A. Perry, M. M ....Keene, N. H.
A. E. Howard, M. C. B........... Keene, N. H.
Chester & Lenoir Ry. (See Rich. & Dan.; (3) Div.)
Chicago, Bur. & Kan. City Ry. (See C. B. & Q.)
Chicago, Burlington & Quincy R. R.
4-8½ g. 3,608 m. 545 lo. 21,012 cars.
T. J. Potter, Gen. Man........... Chicago, Ill.
(1) C., B. & Q., East of Mo. Riv.
H. B. Stone, Asst. Gen. Man....... Chicago, Ill.
Wm. Irving, Gen. Pur. Agt.........Chicago, Ill.
G. W. Rhodes, Supt. M. P.........Aurora, Ill.
Wm. Forsyth, Mech. Eng...........Aurora, Ill.
Ill. Divs.: J. D. Besler, Supt.........Galesburg, Ill.
Chi. Div.: Geo. Alexander, Supt.....Aurora, Ill.
L. E. Johnson, M. M.................Aurora, Ill.
Galesburg Div.: F. C. Rice, Supt. Galesburg, Ill.
Robert Colville, M. M......... Galesburg, Ill.
St. L. Div.: S. E. Crance, Supt..Beardstown, Ill.
A. Forsyth, M. M...............Beardstown, Ill.
Ia. & Mo. Divs.: W. F. Merrill, Supt. Burlington, Ia.
East. Div.: O. E. Stewart, Supt..Burlington, Ia.
Joel West, M. M...............Burlington, Ia.
Mid. Div.: J. B. Maxon, Supt.....Ottumwa, Ia.
West'n Div.: J. H. Duggin, Supt....Creston, Ia.
C. W. Eckerson, M. M..........Creston, Ia.
Chi., B. & Kan. C'y and St. L., Keo. & No.-W'n Rys.
Robt. Law, Gen. Supt............. Keokuk, Ia.
W. H. Bartlett, M. M.............Burlington, Ia.
(2) C. B. & Q., West of Mo. Riv.
G. W. Holdrege, Asst. Gen. Man. Omaha, Neb.
C. M. Wead, Supply Agt...........Omaha, Neb.
D. Hawksworth, M. M.........Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs.:
T. E. Calvert, Gen. Supt. ....Lincoln, Neb.
D. E. Thompson, Supt.............Lincoln, Neb.
E. Bignell, M. M...................Lincoln, Neb.
R. V. Div.: A. Campbell, Supt...... McCook, Neb.
A. & N. Div.: J. McConniff, Supt...Lincoln, Neb.
Chicago, Fairchild & Eau Claire R. R.
4-8½ g. 20 m. 3 lo. 28 cars.
N. C. Foster, Gen. Man ....Fairchild, Wis.
C. I. Wickersham, Pur. Agt ..... Chicago, Ill.
Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 4,528 m. 626 lo. 19,018 cars.
S. S. Merrill, Gen. Man.........Milwaukee, Wis.
R. Miller, Asst. Gen. Man.... Milwaukee, Wis.
J. T. Clark, Gen. Supt..........Milwaukee, Wis.
J. T. Crocker, Pur. Agt.........Milwaukee, Wis.
J. M. Lowry, Gen. M. M........Milwaukee, Wis.
E. Fairbairn, M. M .... Milwaukee, Wis.
John Bailie, Supt. Car Dept...Milwaukee, Wis.
(1) H. C. Atkins, Asst. Gen. Supt..Milwaukee, Wis.
Chi. Div.: Geo. O. Clinton, Supt .....Chicago, Ill.
La Crosse Div.: W. G. Collins, Supt. Milwaukee, Wis.
C. Bluffs Div.: A. J. Earling, Supt.... Marion, Ia.
P. du C. & M. Pt. Divs.:
R. B. Campbell, Supt.........Milwaukee, Wis.
(2) C. H. Prior, Asst. Gen. Supt..Minneapolis, Minn.
H. & D. Div.: M. W. Kellie, Supt. do.
J. O. Pattie, M. M........ Minneapolis, Minn.
Ia. & Minn. Div.: H. R. Williams, Supt. do.
S. Minn. Div.: F. D. Underwood, Supt. Lacrosse, Wis.
Riv. & Dub. Divs.: C. W. Case, Supt. Dubuque, Ia.
S. Charnley, M. M ....Dubuque, Ia.
Ia. & Da. Div.: G. W. Sanborn, Supt. Mason City, Ia.
S. Cy. & Da. Div.: W. J. Underwood, Supt. Sioux Cy, Ia.
F. H. Moulton, M. M............Yankton, Dak.
J. M. Horan, For............... Yankton, Dak.
(3) D. A. Olin, Asst. Gen. Supt.........Racine, Wis.
R. & S. W. Divs.: D. L. Bush, Supt...Racine, Wis.
John Taylor, M. M. ....Racine, Wis.
(4) Northern Div.: L. B. Rock, Supt. Milwaukee, Wis.
Wm. E. Kittredge, M. C. B..Milwaukee, Wis.
Chicago, Rock Island & Pac. Ry.
4-8½ g. 1,381 m. 309 lo. 8,367 cars.
R. R. Cable, Pres. & Gen. Man....Chicago, Ill.
A. Kimball, V. P. & Gen. Supt.....Chicago, Ill.
H. F. Royce, Asst. G. Supt......Davenport, Ia.
F. A. Marsh, Pur. Agt...............Chicago, Ill.
T. B. Twombly, Gen. M. M..........Chicago, Ill.
B. K. Verbryck, Gen. M. C. B.......Chicago, Ill.
Ill. Div.: R. H. Chamberlin, Supt.....Chicago, Ill.
R. Biester, M. M...................Chicago, Ill.
Sam'l Pullman, M. C. B...........Chicago, Ill.
Ia. Divs.: Jno. Given, Supt.......Des Moines, Ia.
J. G. Crockett, M. M................Stuart, Ia.
Jas. E. Morrill, M. M...........Davenport, Ia.
Chas. M. Leonard, M. C. B......Davenport, Ia.
K. & Des. M. Div.: Jno. Given, Supt..Des Moines, Ia.
S. W. Wakefield, M. M............Keokuk, Ia.
Henry Kummer, M. C. B..........Keokuk, Ia.
So.-Wn. Div.: G. F. Walker, Supt....Trenton, Mo.
R. O. Carscadin, M. M..........Trenton, Mo.
Chas. R. Best, M. C. B...........Trenton, Mo.
Chicago, Saginaw & Canada R. R. (See Det., L. & N.)
Chicago, St. Louis & New Orleans R. R. (See Ill. Cen.)
Chicago, St. Louis & Pittsburg R. R.
4-9 g. 635 m. 202 lo. 3,510 cars.
James McCrea, Manager.........Columbus, O.
Wm. Mullins, Gen. Pur. Agt....Pittsburg, Pa.
Edward B. Wall, Supt. M. P.....Columbus, O.
1, 3 & 5 Divs.: J. F. Miller, Supt. Richmond, Ind.
Robert Curtis, M. M............Columbus, O.
J. L. Copeland, G. F. Car Shops. Columbus, O.
W. C. Arp, Gen. For.......Indianapolis, Ind.
2 & 4 Divs.: Chas. Watts, Supt. Logansport, Ind.
W. W. Reynolds, M. M ......Logansport, Ind.
Chas. H. Starr, G. F. C. Shops, Logansport, Ind.
Chicago, St. Louis & Wn. R. R. 4-8½ g. 88 m. 11 lo. 1,799 c.
F. E. Hinckley, Gen. Man.........Chicago, Ill.
A. H. Crocker, Supt................Streator, Ill.
J. N. Chilson, M. C. B...........Streator, Ill.
Chicago, St. Paul, Minneapolis & Omaha Ry.
4-8½ g. 1,280 m. 181 lo. 5,221 cars.
J. M. Whitman, Gen. Supt......St. Paul, Minn.
W. H. S. Wright, Pur. Agt......St. Paul, Minn.
Matt. Ellis, M. M...................St. Paul, Minn.
J. J. Ellis, Asst. M. M..........St. Paul, Minn.
H. L. Preston, M. C. B..............Hudson, Wis.
Ea. & No. Div.: A. A. Hobart, Supt. St. Paul, Minn.
St. Paul and Sioux City Div.:
H. Spencer, Supt ....St. James, Minn.
H. C. Anderson, Asst. M. M.....Sioux Cy, Ia.
Neb. Div.: Geo. V. Morford, Supt....Omaha, Neb.
Jas. McCabe, Asst. M. M .....Omaha, Neb.
Chic., Tex. & Mexican Cent. Ry. (See Gulf, C. & S. F.)
Chicago & Alton R. R. 4-8½ g. 849 m. 213 lo. 6,168 c.
C. H. Chappell, Gen. Man..........Chicago, Ill.
T. L. Bates, Supt. of Trans...Bloomington, Ill.
A. V. Hartwell, Pur. Agt..........Chicago, Ill.
Wm. Wilson, Supt. of Mach...Bloomington, Ill.
Jos. Townsend, G. For. Car Dept. do.
Chi. Div.: A. M. Richards, Supt. Bloomington, Ill.
St. L. & K. C. Div.: S. D. Reeves, Supt. Roodhouse, Ill.
L. H. Miller, M. M.................Slater, Mo.
Chicago & Atlantic Ry. 4-8½ g. 269 m.
J. C. Williams, Gen. Supt..........Chicago, Ill.
Geo. A. Hill, M. M. & M. C. B..Huntington, Ill.
West. Div.: J. H. Parsons, Supt.....Chicago, Ill.
East. Div.: J. H. Tinney, Supt. Huntington, Ind.
Chi. & East'n Ill. 4-8½ g. 252 m. 56 lo. 3,500 cars.
O. S. Lyford, Gen. Supt............Chicago, Ill.
D. R. Patterson, Pur. Agt..........Chicago, Ill.
P. W. Drew, M. Trans.............Chicago, Ill.
Allen Cooke, M. M.................Danville, Ill.
Chicago & Grand Trunk Ry. (See Grand Trunk.)
Chicago & Great Southern Ry.
4-8½ g. 124 m. 4 lo. 122 c.
Henry Crawford, Gen. Man.........Chicago, Ill.
H. Crawford, Jr., Supt............Chicago, Ill.
Chicago & Iowa R. R. 4-8½ g. 104 m. 16 lo. 237 cars.
T. J. Potter, Gen. Man..............Chicago, Ill.
W. H. Holcomb, Gen. Supt........Rochelle, Ill.
H. S. Bryan, M. M.............. Aurora, Ill.
Chicago & Northwestern Ry.
4-8½ g. 3,761 m. 637 lo. 21,000 cars.
Marvin Hughitt, 2d V. Prs. & G. M. Chicago, Ill.
C. C. Wheeler, Gen. Supt..........Chicago, Ill.
W. B. Linsley, Ass't Gen. Supt....Chicago, Ill.
R. W. Hamer, Pur. Agt. ....Chicago, Ill.
Geo. W. Tilton, Supt. M. P. & M.; and
Wm. Campbell, A. Supt. M. P. & M. Chicago, Ill.
Wis. and Mil. Divs. & Sheboygan & W'n Ry.:
Ed. J. Cuyler, Supt...............Chicago, Ill.
Gal. Div.: Chas. Murray, Supt........ Chicago, Ill.
Pen'a Div.: W. F. Fitch, Supt.....Escanaba, Mich.
J. Symons, M. M............ Escanaba, Mich.
Mad. Div.: C. A. Swineford, Supt..Baraboo, Wis.
Minn. & Dak. Divs.: S. Sanborn, Asst. Gen. Supt.
and W. A. Scott, M. M..........Winona, Minn.
Dak. Cen. Ry.: J. S. Oliver, Supt....Huron, Dak.
Ia. Div.: H. G. Burt, Supt.............Boone, Ia.
Geo. W. Lowe, M. M..............Clinton, Ia.
No. Ia. Div.: M. Hopkins, Supt...Eagle Grove, Ia.
Win. & St. P. Div.:
W. P. Cosgrave, Supt............Winona, Minn.
Chicago & West Michigan:
4-8½ g. 409 m. 47 lo. 1,629 cars.
Geo. C. Kimball, V. P. & G. Man. Muskegon, Mich.
A. M. Nichols, Gen. Supt......Gd. Rapids, Mich.
Edw. Hill, Pur. Agt............Muskegon, Mich.
W. F. N. Davis, M. M.........Muskegon, Mich.
Chicago & West'n Ind. R. R. 4-8½ g. 50 m. 12 lo. 150 c.
James Walsh, Gen. Man .... Chicago, Ill.
Cincinnati, Columbus & Hocking Val. Ry.
4-9 g. 25 m. 2 lo. 77 cars.
D. P. Hyatt, Gen. Man.............Dayton, O.
Cin., Georgetown & Portsmouth. 3 g. 35 m. 3 lo. 45 c.
M. Simmons, Supt................Cincinnati, O.
F. Enler, M. M..................Cincinnati, O.
Cincinnati & Green River Ry. 3 g. 11 m. 2 lo. 41 c.
G. B. Harper, Supt...............Grove, Ky.
Geo. Lewis, M. M ....Grove, Ky.
Cin., Hamilton & Dayton R. R. 4-9 g. 352 m. 92 l. 2,932 c.
C. J. Hepburn, Gen. Supt........Cincinnati, O.
John Black, Gen. M. M............. Lima, O.
W. H. H. Allison, M. C. B........Cincinnati, O.
Day. & Mich. Div.:
W. F. Stark, Asst. Supt.............Toledo, O.
Cincinnati, Indianapolis, St. Louis & Chicago Ry.
4-8½ g. 384 m. 71 lo. 3,279 cars.
J. W. Sherwood, Supt........Indianapolis, Ind.
Geo. Tozzer, Pur. Agt.............Cincinnati, O.
J. S. Patterson, M. of Mach. & M. C. B. Cincinnati, O.
Cincinnati, New Orleans & Texas Pacific Ry. Co.
5 g. 846 m. 123 lo. 3,464 cars.
John Scott, Gen. Man.......... Cincinnati, O.
Richard Carroll, Gen. Supt.......Cincinnati, O.
R. W. Healey, Gen. Pur. Agt.....Cincinnati, O.
James Meehan, S. M. P. & M... Cincinnati, O.
Cin. So. Div.: W. W. Wells, Supt..Somerset, Ky.
I. W. Fowle, M. M ....Cincinnati, O.
John Richardson, M. C. B......Cincinnati, O.

BENJAMIN ATHA, Treasurer. RICHARD VOSE, President. D. P. CLARK, Supt.

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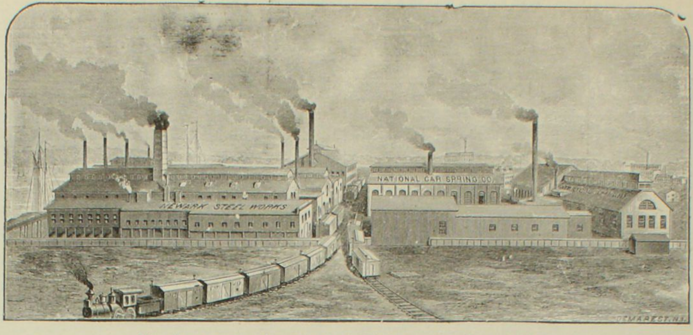
Spring Manufactory and Steel Works, Newark, N. J.



The Largest Crucible Cast-Steel Works in the Eastern States.

NATIONAL CAR SPRING COMPANY,

MANUFACTURERS OF

Elliptic, Volute-Spiral Hebbard, Oval, Round Bar, Rectangular-Passenger & Freight Car Springs

OFFICE, 13 BARCLAY STREET, NEW YORK.

HOPKINS VERSUS LE ROY!

THE QUESTION.

Does the Le Roy Journal Bearing Company "stand ready" to make what are commonly known as Hopkins Journal Bearings, because of numerous disgusting failures, resulting from the use of the weak, gridiron arrangement known as the Le Roy Bearing heretofore made and sold by them, and the consequent necessity of going out of business or giving their customers a really good bearing even if they have to "pirate" the invention for which a patent was granted to Hopkins that has been declared valid by both the Eastern and Western Railroad Association?

Does the Le Roy Company expect to build up a business by infringing Hopkins' Patent, and selling bearings, and a lawsuit with them?

In the recent interference patent fight between Hopkins and Le Roy, the Commissioner of Patents, in his final decision, which was rendered August 31, 1883, says:

"On the broad claim, as well as the specific claim covering the device embodying not only the broad but the specific invention of a journal bearing with a soft metal lining, with ridges or projections so arranged that, upon being brought in contact with the axle, the ridges or projections will yield and spread out so as to make a perfectly-fitting box, priority of invention must be awarded to Hopkins."

As to the specific arrangement for which priority of invention was awarded to Le Roy, all will perceive that the broad claim for which priority of invention is awarded to Hopkins, and the very broad claim embodied in the patent granted him Oct. 16, 1883, in the following words: "A Journal Bearing made of two different metals, one of soft or yielding nature, and the other of a hard or unyielding nature, the soft or yielding carrying ridges or spurs which receive the initial pressure of the journal, and by the rolling action of the same and the load pressure upon the bearing becomes crushed down and spread in conformity with the contour thereof, as described, whereby the surfaces in wearing contact are adjusted to each other, substantially as specified,"

COVERS THE WHOLE CASE

AN OLD ADAGE SAYS:
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V. & M. Div.: E. F. Raworth, *Supt*., and
James B. Browne, *M. M*.....Vicksburg, Miss
V.S. & P. Div.: F. Y. Dabney, *Supt*..Monroe, La
W. Bell Smith, *M. M. & C. B*....Monroe, La..
New Orleans & North-Eastern R. R.
T. S. Williams, *Supt*........New Orleans, La.
Cincinnati Northern Ry. (*See Tol., Cin. & St. L.*
Cincinnati, Selma & Mobile R.R. 5 g. 71 m. 6 lo. 148 c.
A. McCollister, *Gen. Supt*..........Selma, Ala
H. L. Wright, *Pur. Agt*.............Selma, Ala.
J. M. Levis, *M. M*....................Marion, Ala.
Cincinnati, Van Wert & Michigan R. R.
4-9 g. 81 m. 7 lo. 118 cars.
E. C. Dawes, *Gen. Man*...........Van Wert, O.
Cin., Wabash & Mich. Ry. 4-8½ g. 165 m. 13 lo. 402 c.
Norman Beckley, *Gen. Man. & P. A*. Elkhart, Ind.
O. W. Lamport, *Supt*.............Wabash, Ind.
S. B Tinker, *M. M. & M. C. B*...Wabash, Ind
Cin., Wash. & Balt. 4-8½ g. 312 m. 65 lo. 1,422 cars
Jas. H. Stewart, *Gen. Man*.......Cincinnati, O.
Edw. Evans, *M. M*...............Chillicothe, O.
T. G. Duncan, *Supt. Car Dept*.......Zaleski, O.
Cincinnati, Wheeling & New York R.R. 4-8½ g. 13 m.
Thos. R. Sharp, *Pres*..........New York, N. Y.
Cincinnati & Eastern Ry. 3 g. 100 m. 7 lo. 133 cars.
S. Woodward, *Gen. Man*.........Cincinnati, O.
G. H Wilber, *Gen. Sup. & Pur. Agt*. Cincinnati, O.
P. W. Naughton, *M. M*............Newtown, O.
Cincinnati & South-Eastern Ry. 4-8½ g. 18 m.
John V. Patton, *Gen. Man*....Newport, Ky.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 3 lo. 45 cars.
A. H. Kunst, *Pres. & Gen. Man*. Weston, W. Va.
Sam. A. Steel, *M. M*...........Weston, W. Va.
F. Dillie, *M. C. B*..............Nottingham, O.
Cleveland, Columbus, Cincinnati & Indiana and Indianapolis & St. Louis Rys. and Dayton & Union R. R. 4-8½ g. 785 m. 246 lo. 7,988 cars.
E. B. Thomas, *Gen. Man*.........Cleveland, O.
J. L. Yale, *Pur. Agt*..............Cleveland, O.
W. F. Turreff, *Gen. M. M*.........Cleveland, O.
Col. & Cin. Div.: Robt. Blee, *Supt*. Cleveland, O.
Wm. Garsting, *M. M*...........Cleveland, O.
A. G. Steinbrenner, *G. For. Car Dept*. do.
Ind'p'lis Div.: John O. Ewan, *Supt*..Ind'polis, Ind
T. W. Ranson, *M. M*......Brightwood, Ind.
N. Mark, *G. For. Car Dept*. Brightwood, Ind.
Ind. & St L Ry.: Tho. Burrows, *Supt*. St. Louis, Mo.
T. W. Ranson, *M. M. & C. B*. Brightwood, Ind.
Day. & Un. Rd.: J. H. Barrett, *Supt*. Cincinnati, O
H. S. Gordon, *For. M. Shops*......Dayton, O.
Cleveland, Delphos & St. Louis R. R.
3 g. 56 m. 3 lo. 39 cars.
I. H. Burgoon, *Gen. Man*..........Delphos, O.
B. F. Marshall, *M. M*..............Delphos, O.
Cleveland, Indiana & St. Louis R. R.
4-8½ g. 19 m. 2 lo. 20 cars.
J. A. Larned, *Rec. & Supt*......Anderson, Ind.
Cleveland, Mt. Vernon & Delaware R. R.
4-9 g. 144 m. 24 lo. 828 c.
N. Monsarrat, *Gen Supt*..............Akron, O.
G. M. Taylor, *M. M. & C. B*.....Mt. Vernon, O.
Cleve., Youngstown & Pitts. R. R. 3 g. 30 m. 3 lo 138 c.
D. T. Lumley, *Gen. Supt*.........Alliance, O.
C. H. Dorman, *M. M. & M. C. B*....Alliance, O.
Cleveland, Lorain & Wheeling Ry.
4-8½ g. 158 m. 31 lo. 1,878 cars.
Oscar Townsend, *Gen. Man*......Cleveland, O.
Wm. Thornburg, *Supt*.............Lorain, O.
W. A. Stone, *M. M*..................Lorain, O.
Cleve. & Marietta R. R. (*See Wheel. & Lake Erie.*)
Cleveland & Pittsburg. (*See Penna. Co.; (4) Div.*)
Clifton & Port Hudson R. R. 4-8½ g. 22 m. 3 lo. 12 c.
D. W. Pipes, *Supt*...............Clinton, La.
W. F. Lockwood, *M. M*............Clinton, La.
Clove Branch R. R. 4-8½ g. 4 m. 1 lo. 61 cars.
C. L. Kimball, *Supt*..........Mattewan, N. Y.
W. G. Vanbuskirk, *M. M*...Dutchess Jc., N. Y.
Coburg, Peterborough & Marmora Ry.
5-6 g. 47 m. 5 lo. 255 cars.
Jas. R. Barber, *Gen. Supt*.......Cobourg, Ont.
Jas. Clark, *M. M*..................Cobourg, Ont
John Tinney, *M. C. B*............Cobourg, Ont.
Colorado Central R. R (*See Un. Pac.; (4) Div.*)
Columbia & Greenville R. R. (*See Rich. & D.; (3) Div.*)
Columbia & Puget Sound R.R 3 g. 21 m. 7 lo. 114 c.
J. L. Howard, *Gen. Supt*..San Francisco, Cal.
Columbus, Hocking Valley & Toledo Ry.
4-9 g. 324 m. 90 lo. 7,353 cars.
G. R. Carr, *Gen. Supt*.............Columbus, O.
W M. Greene, *Pur. Agt*...........Columbus, O.
Ira G. Hutchins, *M. M*...........Columbus, O.
J. M. Rockafield, *M. C. B*.........Columbus, O.
Tol. Div.: M. T. Seymour, *Supt*......Columbus, O.
Hock. V. Div.: M. P. L. Booth, *Supt*. Columbus, O.
Ohio Riv. Div.: C. D. Norris, *Supt*.......Logan, O.
Columbus & Eastern R. R. In progress
J. E. Redfield, *Pres*..........Columbus, Ohio.
Columbus & Maysville Ry. (*See Cin. & East.*)
Columbus & Rome R. R. 3 g. 33 m. 3 lo. 30 cars.
M. E. Gray, *Supt*...................Columbus, Ga.
Columbus & Western Ry. 5 g. 89 m. 2 lo. 53 cars
E. A. Flewellen, *Gen. Man*. ...Columbus, Ga.
R. A. Bridges, *M. M*................Opelika, Ala.
Concord R. R. 4-8½ g. 141 m. 38 lo. 1,235 cars.
H. E. Chamberlain, *Supt. & P. Agt*. Concord, N.H.
J. T. Gordon, *M. M. & C. B*.. .Concord, N. H
Concord & Claremont R. R. (*See Northern of N. H.*
Conn. Riv. and Ver. Val. R. Rs. 4-8½ g. 130 m. 42 lo. 554 c.
J. Mulligan, *Supt. & Pur. Agt*. Springfield, Mass.
W. H. Stearns, *M. M. & M. C. B*.. Springfield, Mass.
Conn. & Passumpsic Rivers R. R. (*See Passumpsic*)
Connotton Valley R. R. 3 g. 160 m. 26 lo. 997 cars.
Samuel Briggs, *Gen. Man*......Cleveland, O.
B. C. Bosworth, *M. M*...............Canton, O.
Cooperstown & Susquehanna Valley R. R.
4-8½ g. 16 m. 2 lo. 14 cars.
Andrew Shaw, *Pres*.......Cooperstown, N. Y.
A. Mumford, *M. M*........Cooperstown, N. Y.
Corning, Cowanesque & Antrim Ry. (*See Syr., G. & C.*)
Cornwall R. R.. 4-8½ g. 12 m. 5 lo. 166 cars
J. M. Havard, *G. Supt. & M. M*....Lebanon, Pa.
Levi Blonch, *M. C. B*..............Lebanon, Pa.
Coudersport & Port Allegheny R. R.
3 g. 17 m. 2 lo. 64 cars.
B. A. McClure, *Gen. Supt*.....Coudersport, Pa.
Credit Valley Ry. 4-8½ g. 184 m. 22 lo. 535 cars.
Wm. Whyte, *Gen. Supt*..........Toronto, Ont.
John Macnab, *Pur. Agt*.........Toronto, Can.
H. G. Taylor, *Mech. Supt*.......Toronto, Can.
Crooked Creek R. R. 3 g. 9 m. 1 lo. 37 cars.
Walter C. Willson, *Gen. Man*. Webster City, Ia.
Geo. W. Post, *Pur. Agt*..............Lehigh, Ia
Crown Point Iron Co. R. R. 3 g. 13 m. 4 lo. 113 c.
A. L. Inman, *Gen. Man*......Plattsburg, N. Y.
H. L. Reed, *Pur. Agt*.......Crown Point, N. Y.
J. M Davies, *Supt. & M. M*..Crown Point, N. Y.
J. C. Sherman, *M. C. B*.....Crown Point, N. Y.
Cumberland Ry. 4-8½ g. 32 m. 1 lo. 64 c.
J. A. Killam, *Gen. Man*..........Parsboro, N. S.
K. McKinnon, *M. M*.............Parsboro, N. S.
Cumberland Valley R. R. 4-9 g. 127 m. 25 lo. 474 cars.
J. F. Boyd, *Supt*............Chambersburg, Pa.
A. S. Hull, *M. M*...........Chambersburg, Pa.
C. Wicke, *M. C. B*..........Chambersburg, Pa.
Cumberland & Maurice River R. R. 4-8½ g. 20 m.
L. H. Dowdney, *Supt*.........Port Morris, N. J.
Cumberland & Penn. R. R. 4-8½ g. 55 m. 28 lo. 625 c.
P. L. Burwell, *Gen Supt & P A*. Cumberland, Md.
N. W. Howson, *Mast. of Mach*. Mt. Savage, Md.
Nathan Binix, *M. C. B*.........Mt. Savage, Md.

D

Danville & New River R. R. 3 g. 43 m. 2 lo. 30 c.
W. T. Sutherlin, *Gen. Man*.......Danville, Va.
J. F. Morton, *M. M*................Danville, Va.
Danbury & Norwalk R. R. 4-8½ g. 36 m. 7 lo. 112 c.
C. M. Crawford, *G. Supt. & P. A*..S. Norwalk, Ct.
W. H. Wilkinson, *M. M. & C. B*. Danbury, Conn.
Danville, Mocksville & So.-Wn. R. R. 3 g. 28 m.
H. M. Shivler, *Supt*...........Leakesville, N. C.
Danville, Olney & O. R. R. R. 4-8½ g. 110 m. 5 lo. 83 c.
C. E. Henderson, *Rec. & Man*........Olney, Ill.
W. A. Bell, *M. M. & C. B*..........Kansas, Ill.

Dayton & Union R. R. (*See Clev., Col., Cin. & Ind.*)
Dayton & Michigan R. R. (*See Cin., Ham. & Day.*)
Del. Lackawanna & W. and N. Y., Lack. & W. R. Rs.
4-8½ g. 930 m. 436 lo. 31,989 cars.
Wm. F. Halstead, *Gen. Supt*.......Scranton, Pa.
G. W. B. Cushing, *Pur. Agt*....New York, N. Y
Walter Dawson, *Mast. of Mach*...Scranton, Pa.
Robt. McKenna, *M. C. B*............Scranton, Pa.
Bloomsb'g Div.: C. Graham, *M. M*..Kingston, Pa.
Utica Div.: A. C. Salisbury, *Supt*....Utica, N. Y.
Thos. Thatcher, *M. M*...............Utica, N. Y.
Morris & Essex Div.; Sussex; P. & D. and C. R. Rs.
A. Reasoner, *Supt*..................Hoboken, N. J.
W. H. Lewis, *M. M*...............Kingsland, N. J.
J. W. Baker, *Mast. Car Rep*. ....Dover, N. J.
Oswego & Syracuse Div.:
W. B. Phelps, *Supt*..............Oswego, N. Y.
Jas. Buchanan, *M. M*..........Syracuse, N. Y.
Syracuse, Binghamton & New York R. R.
4-8½ g. 81 m. 20 lo. 598 cars.
W. K. Niver, *Gen. Supt*.......Syracuse, N. Y.
Jas. Buchanan, *M. M*.........Syracuse, N. Y.
Cayuga Div.: W. R. Humphrey, *Supt* Ithaca, N.Y.
Delaware, Maryland & Virginia R. R.
4-8½ g. 101 m. 7 lo. 145 cars.
Tho. Groom, *Supt*.......................Lewes, Del.
Geo. Messick, *M. M*...................Lewes, Del.
W. H. Virden, *M. C. B*...............Lewes, Del.
Delaware River R. R. 4-8½ g. 20 m. 3 lo. 4 cars.
E. H. Green, *Supt*...........Pedricktown, N. J.
Delaware Western R. R. (*See Balt. & Phil.*)
Delaware & Chesapeake R. R. (*See Penna.; (4) Div.*)
Delaware & Hudson Canal Co.
4-3 and 4-8½ g. 634 m. 180 lo. 10,799 cars.
C. F. Young, *Gen. Man*.......... Honesdale, Pa.
C. F. Young, *Pur. Agt*............Albany, N. Y.
R. C. Blackall, *Supt. of Mach*.....Albany N. Y.
Susq. Div.: C. D. Hammond, *Supt*. Albany, N. Y..
Tho. Howard, *M. M*.............Oneonta, N. Y.
J. R. Skinner, *M. C. B*..........Oneonta, N. Y.
Sar. & Ch. Divs.: T. Voorhees, *Supt*...Troy, N. Y.
J. L. Corey, *M. M*.........Green Island, N. Y.
Chr. Körner, *M. C. B*......Green Island, N. Y.
Pa. Div.: R. Manville, *Supt & Pur Agt*. and
S. H. Dotterer, *M. M*..........Carbondale, Pa.
T. Orchard, *M. C. B*...........Carbondale, Pa.
Denver Circle R. R. 3 g. 6 m. 3 lo. 15 cars.
Theo. C. Henry, *Gen. Man*.........Denver, Col.
J. H. Bedson, *Gen. Supt*...........Denver, Col.
Denver, Utah & Pacific R. R. 3 g. 34 m. 2 lo. 58 c.
L. M. Fouts, *Supt*.....................Denver, Col.
Denver & New Orleans. 4-8½ g. 140 m. 11 lo. 400 c.
C. W. Fisher, *Gen. Man*............Denver, Col.
Chas. Wheeler, *Pur. Agt*...........Denver, Col.
J. H. Kirk, *M. M. & M. C. B*......Denver, Col.
Denver & Rio Grande Ry. 3 g. 1,665 m. 222 lo. 5,932 c.
D. C. Dodge, *Gen. Man*..............Denver, Col.
C. M. Hobbs, *Pur. Agt*..............Denver, Col.
N. W. Sample, *Supt. M. P. & M*....Denver, Col.
(1) Col & N. M. Div.: R. E. Ricker, *G. S*. Denver, Col.
1st Div.: W. W. Borst, *Supt*.......S. Pueblo, Col.
2d Div.: Cole Lydon, *Supt*..........Alamosa, Col.
3d Div.: G. W. Cook, *Supt*........Leadville, Col.
4th Div.: R. M. Ridgway, *Supt*.......Salida, Col.
(2) Utah Div.: W. H. Bancroft, *G.S*. S. Lake City, Utah.
Des Moines, Osceola & Southern R. R.
3 g. 100 m. 7 lo 253 cars.
Henry Stivers, *Gen. Supt*..........Osceola, Ia.
L. D. Berry, *M. M*......................Osceola, Ia.
Elias Tonet, *M. C. B*...................Osceola, Ia.
Des Moines & Ft. Dodge. 4-8½ g. 144 m. 13 lo. 350 c.
C. N. Gilmore, *Supt*..............Des Moines, Ia.
John McGrayel, *M. M*......Grand Junction, Ia.
E. A. Avery, *M. C. B*.........Grand Junction, Ia.
Det., Gr. H. & Mil. Ry. 4-8½ g. 189 m. 39 lo. 696 c.
G. R. Nash, *Gen. Man*...............Detroit, Mich.
John S. Lorimer, *Storekeeper*....Detroit, Mich.
W. J. Morgan, *Supt*..................Detroit, Mich.
H. Roberts, *Mech. Supt*........Ft. Gratiot, Mich.
Det., Lansing & No'n R. R. 4-8½ g. 222 m. 84 lo. 1027 c
John B. Mulliken, *Gen. Man*......Detroit, Mich.
Allan Bourn, *Pur. Agt*..............Detroit, Mich.
Thos. M. Fish, *Gen. Supt*............Ionia, Mich.
G. C. Watrous, *M. M. & C. B*.......Ionia, Mich.
Det., Mack. & Marq. R.R. 4-8½ g. 152 m. 16 lo. 1,112 c.
D. McCool, *Gen. Supt. & P. A*. Marquette, Mich.
John B. Wilson, *Mech. Supt*....Marquette, Mich.
Dorchester & Delaware R.R. (*See Penna. (4) Del. Div.*)
Dubuque & Dakota R. R. 4-8½ g. 64 m. 2 lo. 54 cars.
A. C. Goodrich, *Supt*..................Waverly, Ia.
W. S. Couch, *Pur. Agt*...............Dubuque, Ia.
Duck River Valley R. R. (*See Nash., Chat. & St. L.*)
Dunkirk, Allegheny Valley & Pittsburgh R. R.
4-8½ g. 91 m. 14 lo. 102 cars.
D. Thayer, *Gen. Supt*..............Dunkirk, N. Y.
R. C. Moore, *Pur. Agt*...........New York, N. Y.
J. C. Haggett *M. M. & C. B*.....Dunkirk, N. Y.

E

East Alabama Ry. 5 g. 22 m. 3 lo. 19 cars.
W. W. Barnes, *Supt*...................Opelika, Ala.
East Broad Top R. R. 3 g. 30 m. 7 lo. 260 cars.
A. W. Sims, *Supt*....................Orbisonia, Pa.
A. W. Greenwood, *M. M*..........Orbisonia, Pa.
East St Louis & Carondelet Ry. 4-9 g. 4 lo. 27 c.
Joseph Hill, *Gen. Supt*......East St. Louis, Ill.
East Tenn. & Western North Car. R. R.
3 g. 34 m. 2 lo. 70 cars.
Thomas E. Matson, *Supt*. .Elizabethton, Tenn.
East Tennessee, Virginia & Georgia R. R.
5 g. 1,453 m. 173 lo. 3,670 cars.
Henry Fink, *V.P. & Gen. Man*. Knoxville, Tenn.
J. F. O'Brien, *Gen. Supt*.......Knoxville, Tenn.
J. E. Wilcox, *Pur. Agt*.........Knoxville, Tenn.
East Tenn. Div. and No. Car. and Ohio Branches:
F. K. Huger, *Supt*..............Knoxville, Tenn.
B. J. Sitton, *M. M*...............Knoxville, Tenn.
Jos. Armbruster, *M. C. B*....Knoxville, Tenn.
Alabama Div.: J. M. Bridges, *Supt*...Selma, Ala.
Simon Gay, *M. M*.........................Selma, Ala.
W. W. Pierce, *M. C. B*...................Selma, Ala.
Memphis & Charleston R. R. (Div.):
R. B. Pegram, Jr., *Supt*......Memphis, Tenn.
H. N. Burford, *M. M*...........Memphis, Tenn.
Atlanta Div.: J. W. Fry, *Supt*......Atlanta, Ga.
M. J. Rogers, *M. M*...................Atlanta, Ga.
J. H. Perkins, *M. C. B*...............Atlanta, Ga.
Brunswick Div.: J. E. Mallory, *Supt*..Macon, Ga.
East & West R. R. of Ala. 3 g. 110 m. 9 lo. 85 c.
John Postell, *Gen. Man*.........Cedartown, Ga.
C. F. West, *M. M. & C. B*.........Cedartown, Ga.
Eastern R. R. 4-8½ g. 283 m. 110 lo. 2,268 cars.
Payson Tucker, *Gen. Man*.........Boston, Mass.
D. W. Sanborn, *Mast. of Trans*..Boston, Mass.
G. F. Hurd, *Pur. Agt*................Boston, Mass.
Amos Pilsbury, *S. M. P. & M*...E. Boston, Mass.
J. D. Billings, *G. For. Car Dept*...Salem, Mass.
Con'y Div.: J. W. Sanborn, *Supt*., Wolfboro J., N.H.
Eastern Kentucky R. R. 4-8½ g. 34 m. 5 lo. 160 c.
H. W. Bates, *Man. & Pur. Agt*...Riverton, Ky.
H. W. Crawford, *M. M*...........Hunnewell, Ky.
Eastern (Maine) R. R. (*See Maine Central.*)
Eastern Shore R. R. 4-8½ g. 38 m. 3 lo. 9 c.
W. Thompson, *Supt*.........Princess Anne, Md.
F. Strattner, *M. M*..........Princess Anne, Md.
Elberton Air-Line R.R. (*See Rich. & Dan. N. G. Brs.*)
Elizabeth City & Norfolk R.R. (*See Norfolk So.*)
Elizabethtown, Lex. & Big Sandy R.R. (*See Ches. & O.*)
Emmitsburg R. R. (*See Western Md.*)
Erie & Pittsburg R. R. (*See Penna. Co.; (3) Div.*)
Eureka Springs Ry. 4-8½ g. 19 m. 1 lo. 9 cars.
Powell Clayton, *Gen. Man*. Eureka Springs, Ark.
Eureka & Palisade R. R. 3 g. 97 m. 7 lo. 125 cars.
B. Gilman, *Gen. Supt & Pur. Agt*.. Eureka, Nev.
J. M. Crawford, *M. M*...............Palisade, Nev.
A. S. Longley, *M. C. B*..............Palisade, Nev.
European & North American R. R. (*See Maine Cen.*)
Evansville, Rockport & E'n Ry. 4-9 g. 71 m. 5 lo. 98 c.
H. L. Shepard, *Supt*...............Evansville, Ind.
Evansv. & Terre Haute. 4-8½ g. 169 m. 26 lo. 973 c.
D. J. Mackey, *Gen. Supt*.......Evansville, Ind.
John Torrance, *M. M*...........Evansville, Ind.

F

Fitchburg R. R.. 4-8½ g. 152 m. 100 lo. 3,430 cars.
John Adams, *Gen. Supt*...........Boston, Mass.
F. S. Pratt, *Pur. Agt*................Boston, Mass.
G. A. Coolidge, *Supt. M. P*.........Boston, Mass.
W. A. Foster, *Asst. Supt. M. P*..Fitchburg, Mass.
J. W. Marden, *M. C. B*.....Charlestown, Mass.

Flint & Pere Marq.' 4-8½ g. 346 m. 72 lo. 2,100 cars.
H. C. Potter, *Gen. Man*......E. Saginaw, Mich.
D. Edwards, *Asst. Gen. Man*..E. Saginaw, Mich.
G. G. Cook, *Pur. Agt*.........E. Saginaw, Mich.
Sanford Keeler, *Gen. Supt*..E. Saginaw, Mich.
W. F. Potter, *Supt*. (E. Div.)..E. Saginaw, Mich.
M. V. Meredith, *Supt*. (W. Div.) E. Saginaw, Mich.
T. J. Hatswell, *M. M*..........E. Saginaw, Mich.
R. McPherson, *M. C. B*........E. Saginaw, Mich.
Florida Ry. & Nav. Co. 5 g. 488 m. 31 lo. 307 c.
Florida Southern Ry. 3 g. 91 m. 6 lo. 96 cars.
Sherman Conant, *Gen. Man*.......Palatka, Fla.
Jas. D. Hollister, *Supt*.............Palatka, Fla.
Fonda, Johnst'n & Gloversv. 4-8½ g. 26 m. 5 lo. 35 c.
Lawton Caten, *Supt*...........Gloversville, N. Y.
G. V. Putman, *M. M*...........Gloversville, N. Y.
Fond du Lac, Amboy & Peoria. 3 g. 30 m. 2 lo. 35 c.
Alonzo Kinyon, *Supt. & P. A*. Fond du Lac, Wis.
Fort Dodge & Fort Ridley R. R. (*See Minn. & St. L.*)
Franklin & Prov. & Hopkinton. 22 m.
E. T. Logee, *Supt*...............Milford, Mass.
Ft. Madison & No.-West'n Ry. 3 g. 45 m. 5 lo. 127 c.
S. B. Kenrick, *Supt. & Pur. Agt*. Ft. Madison, Ia
I. L. Lamb, *M. M. & C. B*.....Ft. Madison, Ia
Ft. Wayne, Cin. & Louisv. 4-8½ g. 128 m. 10 lo. 250 c.
White Water R. R 4-8½ g. 65 m. 5 lo. 170 cars.
W. W. Worthington, *Gen. Supt*...Ft. Wayne, Ind.
T. H. Haberkorn, *M. M*..........Ft. Wayne, Ind.
Wm. Knight, *M. C. B*............Ft. Wayne, Ind.
Fort Worth & Denver City Ry.
4-8½ g. 114 m. 8 lo. 443 cars.
C. L. Frost, *Gen. Supt*.......Fort Worth, Tex.
Freehold & New York Ry. 4-8½ g. 15 m. 4 lo. 40 c.
J. E. Ralph, *Supt. & Pur. Agt*..Keyport, N. J.
M. C. Mooney, *M. M*..............Freehold, N. J.
C. H. Snedeker, *M. C. B*.......Freehold, N. J.
Fulton County N. G. Ry. 3 g. 61 m. 4 lo. 168 cars.
A. C. Atherton, *Gen. Supt. & P. Agt*. Lewiston, Ill.

G

Gainesville & Dahlonega R. R. 3 g. 15 m.
W. P. Price, *Pres*..................Dahlonega, Ga.
Gainesville, Jefferson & Southern R.R. (*See Cen. of Ga*)
Gal., Harrisburg & San Antonio Ry. (*See Cen. Pac.*)
Galveston, Houston & Hend. R.R. (*See Mo. Pac. (5) Div.*)
Galveston, Sabine & St. Louis Ry.
4-8½ g. 15 m. 2 lo. 27 cars.
Brad. Barner, *Gen. Man*.......Longview, Tex.
Chas. H. Jewell, *Gen. Supt*.....Longview, Tex.
Geneva, Ithaca & Sayre R. R. (*See Lehigh Val.*)
George's Creek & Cumberland R. R.
4-9 g. 25 m. 6 lo. 212 cars.
J. A. Millholland, *Gen. Man*..Cumberland, Md.
Georgetown & Lane's R. R. 5 g. 36 m. 2 lo. 52 c.
G. W. Earle, *Gen. Supt*......Georgetown, S. C.
Georgia R. R. 5 g. 307 m. 42 lo. 1,017 cars.
John W. Green, *Gen. Man*.........Augusta, Ga.
John S. Cook, *M. M*................Augusta, Ga.
T. M. Preval, *M. C. B*...............Augusta, Ga.
Georgia Pacific Ry. 5 g. 218 m.
I. Y. Sage, *Gen. Supt*........Birmingham, Ala.
S. H. Purcell, *Div. Supt*.......Greenville, Miss.
W. T. Newman, *M. M*.................Atlanta, Ga.
J. B. Shelton, *M. C. B*..........Greenville, Miss.
Grand Haven R. R. (*See Chic. & W. Mich.*)
Grand Junction Ry. (*See Midland of Can.*)
Grand Rapids, Indiana & Mackinaw. (*See Gr. R. & I.*)
G'd Rap., Newaygo & L. S. R. R. (*See Chic. & W. M.*)
Grand Rapids & Indiana. 4-8½ g. 528 m. 52 lo. 1,724 c.
W. O. Hughart, *Gen. Man*. Grand Rapids, Mich.
W. R. Shelby, *Pur. Agt*....Grand Rapids, Mich.
S. D. Bradley, *M. M*......Grand Rapids, Mich.
No'n Div.: J. M. Metheany, *Supt*. G'nd Rap., Mich.
So'n Div.: P. S. O'Rourke, *Supt*. Fort Wayne, Ind.
Grand Southern Ry. of New Brunswick.
4-8½ g. 82 m 5 lo. 54 cars.
J. N. Greene, *Gen. Man*......St. George, N. B.
F. W. Holt, *Supt*..................St. George, N. B.
Thomas Logan, *M. M*.........St. George, N. B.
Grand Tower & Carbondale. 4-8½ g. 25 m. 6 lo. 357 c.
T. M. Williamson, *Supt. & P. A*.. Gr. Tower, Ill.
Hugh Smith, *M. M. & C. B*....Grand Tower, Ill.
Grand Trunk Ry. 4-8½ g. 2,332 m. 660 lo. 16,330 c.
Joseph Hickson, *Gen. Man*......Montreal, Can.
Wm. Wainright, *Asst. Man*......Montreal, Can.
Mont. Divs.: W. J. Spicer, *Supt*. Montreal, Can.
Jno. Taylor, *Gen. Storekeeper*. Montreal, Can.
Herbert Wallis, *Mech. Supt*...Montreal, Can.
Wm. McWood, *Supt. Car Dept*. Montreal, Can.
J. Haskoni, *Div. M. S*.........Richmond, P. Q.
Gt. West'n Div.: Chas. Stiff, *Supt*. Hamilton, Ont.
E. Baines, *Store Kpr*..............London, Ont.
C. K. Domville, *Mech. Supt*....Hamilton, Ont.
C. F. Hanson, *Lo. For*...............London, Ont.
J. D. McIlwain, *Supt. Car Dept*..London, Ont.
Chi. & Gr. Trunk Ry. 4-8½ g. 339 m. 103 lo. 1,191 c.
S. R. Callaway, *Gen. Man*.......Chicago, Ill.
W. H. Pettibone, *Supt*. ..Battle Creek, Mich.
A. Judd, *Pur. Agt*.............Fort Gratiot, Mich.
H. Roberts, *Mech. Supt*....Port Huron, Mich.
Midland of Can. 4-8½ g. 471 m. 44 lo. 1,423 c.
W. B. Ferguson, *Supt*.........Peterboro, Ont.
J. D. Barnet, *Mech. Supt*.....Peterboro, Ont.
Grand Trunk, Georgian Bay & Lake Erie Ry. (*See G.T.*)
Great Western Ry. (*See Grand Trunk; G. W. Div.*)
Green Bay, Winona & St Paul R. R.
4-8½ g. 250 m. 19 lo. 623 cars.
Timothy Case, *Gen. Man. & P. A*. Green Bay, Wis.
A. Fenwick, *M. M*...............Ft. Howard, Wis.
Green Cove Spring & Melrose R.R. 3 g. 32 m. 1 lo. 11 c.
S. Ackley, *Pres*.....................Philadelphia, Pa.
Greenwich & Johnsonville Ry. 4-8½ g. 15 m. 1 lo. 7 c.
J. H. Thompson, *Supt*..........Greenwich, N. Y.
Gulf, Col. & Santa Fé Ry. 4-8½ g. 536 m. 43 lo. 1,400 c.
Webster Snyder, *Gen. Man*..Galveston, Texas.
F. P. Killeen, *Sec*................Galveston, Texas.
Jno. W. Thorne, *Pur. Agt*....Galveston, Texas.
G. B. Nichols, *M. M. C. B*.....Galveston, Texas.
Gulf, W'n Texas & Pac. Ry. 4-8½ g. 68 m. 6 lo. 74 c.
M. D. Monserrate, *Supt. & Pur. Agt*. Cuero, Tex.
James Mooney *M. M*....................Cuero, Texas.

H

Hannibal & St. Jo. R. R. 4-8½ g. 292 m. 76 lo. 1,906 c.
J. F. Barnard, *Gen. Man*...........Chicago, Ill.
T. L. Dunn, *Gen. Supt*............Hannibal, Mo.
Wm. Irving, *Pur. Agt*..............Hannibal, Mo.
Jas. Long, *Supt. M. P. & Car Dep*. Hannibal, Mo.
Chas. Coller, *For. Car Dept*.....Hannibal, Mo.
Hanover Branch R. R. 4-8½ g. 8 m. 2 lo. 18 cars.
E. Y. Perry, *Supt*.........South Hanover, Mass.
Hanover Junction, Hanover & Gettysburg R. R.
4-8½ g. 74 m. 10 lo. 140 cars.
H. D. Scott, *Gen. Supt*..........Gettysburg, Pa.
John J. Bingley *M. M*...............Hanover, Pa.
Jas. Harthorn, *M. C. B*.............Hanover, Pa.
Harrisburg & Potomac R. R. 4-8½ g. 35 m. 3 lo. 35 c.
R. H. Middleton, *Supt*......Boiling Springs, Pa.
Hartford & Conn. Val. R. R. 4-8½ g. 47 m. 9 lo. 196 c.
O. M. Shepard, *Asst. Supt*.... New Haven, Ct.
John Henry, Jr., *M. M*.........Hartford, Conn.
Hartford & Conn. W'n R.R. 4-8½ g. 110 m. 16 lo. 495 c.
John F. Jones, *Supt*.................Hartford, Ct.
J. C. Barton, *M. M*...................Hartford, Ct.
Hartwell R. R. (*See Rich. & Dan; N. G. Brs.*)
Hecla & Torch Lake R. R. 4-1 g. 5 m 5 lo. 165 cars.
W. A. Childs, *Gen. Man*.........Calumet, Mich.
Herkimer, Newport & Poland Ry.
3-6 g. 17 m. 2 lo. 24 cars.
Albert Wilber, *Supt*.............Herkimer, N. Y.
Hobart & Manistee River R. R. 3 g. 9 m. 2 lo. 42 c.
H. W. Marsh, *Supt*.................Hobart, Mich.
Hot Springs R. R. 3 g. 25 m. 3 lo. 37 cars.
J. N. Conger, *Supt*.............Hot Springs, Ark.
I. Finlay, *M. M*.......................Malvern Ark.
Housatonic R. R. 4-8½ g. 126 m. 25 lo. 571 cars.
W. H. Yeomans, *Supt*..............Bridgeport, Ct.
D. S. Draper, *Pur. Agt*............Bridgeport, Ct.
N. Slingland, *M. M*................Falls Village, Ct.
J. J. Ferris, *M. C. B*..............Falls Village, Ct.
Houston Belt Ry. 4-8½ and 3 gauge 16 miles.
S. L. Werden, *V. P. & Gen. Man*. Houston, Tex.
Houston, East & West Tex. Ry. 3 g. 150 m. 10 lo. 570 c.
Paul Bremond, *Pr. & Pur. Agt*. .Houston, Tex.
E. L. Bremond, *Gen. Man*.........Houston, Tex.
B. O. Diffey, *M. M*..................Houston, Tex.
C. F. Schelewa, *M. C. B*.........Houston, Texas.

Houston & Tex. Cen. Ry. 4-8½ g. 750 m. 78 lo. 2,526 c.
J. Waldo, *V. Pr. & Gen. Man*....Houston, Tex.
A. H. Swanson, *Gen. Tr. Man*.....Houston, Tex.
E. S. Larchar, *Pur. Agt*.........New York, N. Y.
L. C. Noble, *Gen. M. M*............Houston, Tex.
James McGee, *M. C. B*...............Houston, Tex.
So. & Wn. Divs.: M. G. Howe, *Supt*. Houston, Tex.
No. & Ml. Divs.: G. A. Quinlan, *Supt*., and
C. H. Burns, *Asst. M. M*......Corsicana, Tex.
No.-Wn. Div.: Donald Allen, *Supt*.... Waco, Tex.
Humeston & Shenandoah R. R.
4-8½ g. 113 m. 18 lo. 80 cars.
F. O. Wyatt, *Gen. Man*.............Clarinda, Ia.
C. H. Warren, *Supt*..................Clarinda, Ia.
W. B. Snyder, *M. M*...............Shenandoah, Ia.
Huntingdon & Br. Top Mt. 4-8½ g. 62 m. 18 lo. 69 c.
Geo. F. Gage, *Gen. Man*.........Huntingdon, Pa.
Samuel B. Knight, *Pur. Agt*..Philadelphia, Pa.
William Barkla *M. M*...........Saxton Pa.

I

Illinois Central R. R. 4-8½ g. 1,928 m. 334 lo. 8,565 c.
E. T. Jeffery, *Gen. Supt*.............Chicago, Ill.
O. Ott, *Pur. Agt*.........................Chicago, Ill
Henry Schlacks, *Supt. of Mach*....Chicago, Ill.
W. B. Snow, *M. M. Car Works*.....Chicago, Ill.
(1) Ill. & Ia. Divs.: C. A. Beck, *Supt*.....Chicago, Ill.
Chic. Div.: T. J. Hudson, *Supt*.......... Cairo, Ill
Wm. Renshaw, *M. M*...............Chicago, Ill.
Mid. Div.: H. L. Frisbie, *Supt*...........Pontiac, Ill.
Spring. Div.: W. Wilkinson, *Supt*. Springfield, Ill.
W. B. McKenna, *M. M*..............Clinton, Ill.
No'n Div.: J. C. Jacobs, *Supt*............Amboy, Ill.
J. B. Edams, *M. M*..........................Amboy, Ill.
Ia. Div.: M. Gilleas, *Supt*.............Dubuque, Ia.
Thos. W. Place, *M. M*...............Waterloo, Ia.
(2) So. Divs.: C. M. Sheafe, *Supt*....New Orleans, La.
Geo. W. Baxter, *M. C. B*..McComb City, Miss.
So. Div.: J. M. Turner, *Supt*. do.
E. D. Anderson, *M. M*...McComb City, Miss.
Miss. Div.: J. G. Mann, *Supt*......Jackson, Tenn.
J. F. White, *M. M*........Water Valley, Miss.
Illinois Midland Ry. 4-8½ g. 176 m. 12 lo. 611 cars.
D. H. Conklin, *Rec. & Gen. Man*......Decatur, Ill.
O. E. Grady, *Train Mast*..............Decatur, Ill.
Frank Young, *For. Shops*..................Paris, Ill.
Illinois & St. Louis R. R. 4-8½ g. 19 m. 10 lo. 450 c.
C. H. Sharman, *Gen. Supt. & P. A*. St. Louis, Mo.
D. J. Timlin, *M. M*.......................Belleville, Ill.
Charles Rothe, *M. C. B*.........E. St. Louis Ill.
Indiana, Bloomington & Western Ry.
4-8¾ g. 826 m. 112 lo. 4,067 cars.
C. E. Henderson, *Gen. Man*. Indianapolis, Ind.
I. H. Wilson, *Gen. Supt*.......Indianapolis, Ind.
H. C. Norton, *Pur. Agt*........Indianapolis, Ind.
Jos. S. Porter, *M. M*...................Sandusky, O.
B. Warren, *Gen. M. M*..........Indianapolis, Ind.
Peoria Div.: E. Hiserodt, *M. M*..... Urbana, Ill.
St. Louis Div.: John King, *M. M*. Indianapolis, Ind.
Ohio So. Rd.: W. H. Van Tassall, *S*.. Springfield, O.
A. J Sanborn, *M. M*............Springfield, O.
Indiana, Illinois & Iowa R.R. 4-8½ g. 104 m. 5 lo. 83 c.
F. M. Drake, *Gen. Man*..............Kankakee, Ill.
T. P. Shonts, *Gen. Supt*.............Kankakee, Ill.
R. C. Ackley, *M. M*.....................Kankakee, Ill.
Indiana & Illinois Southern Ry. 3 g. 91 m. 3 lo. 69 c.
W. C. Lyon, *Gen. Man. & P. Agt*. Robinson, Ill.
J. S. Pickering, *M. M. & C. B*...Effingham, Ill.
Indianapolis, Decatur & Springfield Ry.
(*See Ind., Bloom. & West'n.*)
Indianapolis & St. Louis R. R. (*See C., C., C. & I.*)
Indianapo. & Vincennes R. R. (*See Penna. Co.; (8) Div.*)
Intercolonial Ry. 4-8½ g. 846 m. 135 lo. 4,500 cars.
David Pottinger, *Chief Supt*.....Moncton, N. B.
T. V. Cook, *Gen. Storekeeper*...Moncton, N. B.
H. A. Whitney, *Mech Supt*.......Moncton, N. B
Ewd. D. Shaffer, *M. C. B*........Moncton, N. B.
M. & C. Div.: J. E. Price, *Supt*..Cambellton, N. B.
Hal. & St. J. Div.: J. J. Wallace, *Supt*..Truro, N. P
Q. & St. F. Div.: A. McDonald, *Supt*. Riv. du Loup, Q.
International Ry. 4-8½ g. 69 m. 7 lo. 12 cars.
D. E. McFee, *Supt*...............Sherbrooke, Que
J. Ruelle, *M. M*..................Sherbrooke, Que.
W. Charest, *M. C. B*............Sherbrooke, Que.
International & Gt. N'n R. R. (*See Mo. Pac.; (5) Div.*)
Iowa Falls & Sioux City R. R. (*See Ill. Cen.*)
Iron Ry. (*See Tol., Cin. & St. L.*)
Iron Mountain & Helena R. R. (*See Mo. Pac.; (4) Div.*)
Ithaca Auburn & Western Ry. (*See Southern Cen.*)

J

Jacksonville So.-E'n R. R. 4-8½ g. 54 m. 5 lo. 69 c.
E. S. Greenleaf, *Supt*..........Jacksonville, Ill.
Ira F. Petrie, *M. M*.............Jacksonville, Ill.
Jacksonville, St. Augustine & Halifax River Ry.
3 g. 76 m. 3 lo. 27 cars.
W. L. Crawford, *Gen. Man*..Jacksonville, Fla.
H. S. Ming, *Supt*..................Jacksonville, Fla.
Jacksonv., Pensacola & Mob. (*See Fla. Cent. & W.*)
Jamesville & Washington R. R. (*See Norfolk So'n.*)
Jeffersonv'l, Madison & Indpls. R. R. (*See (9) Pa. Co.*)
Jersey City & Albany R. R. 4-8½ g. 38 m.
J. W. McCulloh, *Manager* ...Jersey City, N. J.
Jersey City & Bergen R. R. 4-8½ g. 6 m. 2 lo. 13 c.
T. M. Sayre, *Gen. Supt*..........Jersey City, N. J.
Jersey Shore, Pine Creek & Buff. Ry. (*See Phil. & R.*)
Junction & Breakwater R.R. (*See Del., Md. & Va.*

K

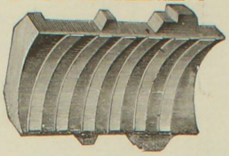
Kaaterskill R. R. 3 g. 8 m.
J. H. Jones, *Supt*.....................Rondout, N. Y.
Kankakee & Seneca R.R. (*See Cin., Ind., St. L. & Chi.*)
Kansas Central R. R. (*See Union Pacific.*)
Kansas City, Fort Scott & Gulf R. R.
4-8½ g. 389 m. 75 l. 2,037 c.
Geo. H. Nettleton, *Gen. Man*..Kansas City, Mo.
L. W. Towne, *Supt*...............Kansas City, Mo.
H. P. Jacques, *Pur. Agt*.......Kansas City, Mo.
J. S. McCrum, *M. M*.............Kansas City, Mo.
A. N. Montier, *M. C. B*.........Kansas City, Mo.
Kansas Cy, Lawrence & So. Kan. (*See At., Top. & S.F.*)
Kansas City, Springfield & Memphis R. R
4-8½ g. 283 m. 10 lo. 456 cars.
George H. Nettleton, *Pres*....Kansas City, Mo.
L. W. Towne, *Supt*..............Kansas City, Mo.
H. P. Jacques, *Pur. Agt*.......Kansas City, Mo.
J. S. McCrum, *M. M*............Kansas City, Mo.
A. H. Montier, *M. C. B*........Kansas City, Mo.
Kansas City, St. Joseph & Council Bluffs; and St. Jo. & Des Moines R. Rs. 4-8½ & 3 g. 368 m. 41 lo. 1,148 c.
J. F. Barnard, *Gen. Supt*.........St. Joseph, Mo.
Wm. Irving, *Pur. Agt*.................Chicago, Ill.
F. A. Chase, *M. M*.................St. Joseph, Mo.
Thos. Aylesbury, *G. For. Car. Dep*. St. Joseph, Mo.
Kansas City & Southern Ry. 4-8½ g. In progress.
Wm. Bailey, *Pres*................Kansas City, Mo.
Kansas Coal Belt R. R. 4-8½ g. In progress.
C. H. Malin, *Gen. Man*..................Girard, Kan.
F. A. Hill, *Supt*...........................Girard, Kan.
Kansas & Gulf Short Line R. R. 33 m. 2 lo. 32 cars.
Eli Culverhouse, *Gen. Man*..............Tyler, Tex.
V. K. Stevenson, *Pur. Agt*.....New York, N. Y.
Kendall & Eldred R. R. (*See Buf., N. Y. & Phil.*)
Kent Northern Ry. 4-8½ g. 27 m. 2 lo. 16 cars.
J. C. Brown, *Gen. Man*.......Richibucto, N. B.
Kentucky Central R. R. 4-9 g. 184 m. 22 lo. 640 cars.
G. W. Bender, *Supt*..............Covington, Ky.
A. H. Watts, *M. of Mach*. ......Covington, Ky.
M. C. B........Covington, Ky.
Kentucky & South Atlantic Ry. 3 g. 23 m. 3 lo. 52 c.
Geo. B. Harper, *Supt. & P. A*..Mt. Sterling, Ky
S. P. Hatfield, *M. M*............Mt. Sterling, Ky.
Keokuk & Des Moines R.R. (*See Chi., R. I. & Pac.*)
Kinzua R. R. (*See Buf., N. Y. & Phil.*)
Kingston & Pembroke Ry. 4-8½ g. 90 m. 9 lo. 214 c.
B. W. Folger, *Supt*....................Kingston, Ont.
J. H. Taylor, *Pur. Agt*..............Kingston, Ont.
J. H. Taylor, *M. M*...................Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 5 lo. 103 cars.
C. A. Coombs, *Supt*..........................Bath, Me.
Wm. A. Field, *M. M*........................Bath, Me.
C. L. Turner, *M. C. B*.......................Bath, Me.
Knoxville & Augusta R. R. 5 g. 16 m. 2 lo. 34 cars.
R. N. Hood, *Gen. Man. & P. Agt*. Knoxville, Tenn.
J. M. Hood, *Supt*......................Knoxville, Tenn

L

Lackawanna & Pittsburg R. R. 3 g. 101 m.
R. M. Patterson, *Gen. Supt*...Friendship, N. Y.
Lake Champlain & Moriah R.R. 4-8½ g. 8 m. 8 lo. 222 c.
E. B. Hedding, *Supt*.........Port Henry, N. Y.

FINALLY

LE ROY VICTORIOUS.



It is falsely pretended that our invention infringes an alleged patent held by Mr. Hopkins. We hereby offer **$2,500** *to Mr. Hopkins if he will commence and prosecute in good faith an action against us to settle the point; and, as we believe he has no valid patent, we stand ready to manufacture and sell his brasses in order that he may sue us. See Babbitt Patent, Sept. 4, 1840, and Joseph Gordnan, March 12, 1861. GEORGE W. McLEAN, President.*

The following is the FINAL decision of the Patent Office in the matter of the Interference of HOPKINS vs. LE ROY, rendered August 31, 1883

“COPY.”

Department of the Interior, United States Patent Office
Washington, D. C., Sept. 1, 1883.

“In the matter of the interference of HOPKINS vs. LE ROY. On Appeal to the Commissioner.

“For a Journal Box composed of Hard and Soft Metal, the **SOFT METAL BANDS PROJECTING ON THE JOURNAL BEARING SIDE BEYOND THE SURFACE OF THE HARD METAL**, Priority of Invention Must be Awarded to LE ROY.”

By direction of the Commissioner.

Very respectfully,
(Signed) SCHUYLER DINGEE, Chief Clerk.

To T. V. LE ROY, Care John R. Bennett, No. 237 Broadway.
George Harding, Counsel.

Thus reversing all former decisions made in favor of HOPKINS, dissolving the interference heretofore declared in his favor, and sustaining the validity of the LE ROY Patent and every claim made by LE ROY for his Invention.

LE ROY JOURNAL BEARING CO.,
145 Broadway, New York City. GEO. W. McLEAN, President.

THE “SWIFT” AUTOMATIC LUBRICATOR.

A PERFECT MACHINE FOR THE INTERNAL LUBRICATION OF THE

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NATIONAL EXPOSITION OF RAILWAY APPLIANCES
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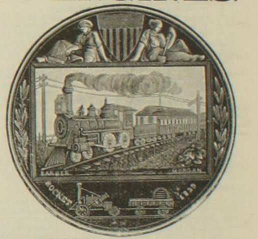
LUBRICATOR
CHICAGO 1883

This device delivers any desired quantity to each cylinder POSITIVELY, and its feed-rate remains unchanged with the Engine at FULL STROKE, THROTTLED or REVERSED.

ill feed any ordinary Lubricant from the lightest oils to the

HARDEST TALLOW

IN THE COLDEST WEATHER.



Positive Feed, Flash “Sight.”

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NO GLASS TUBES OR LOOSE JOINTS.

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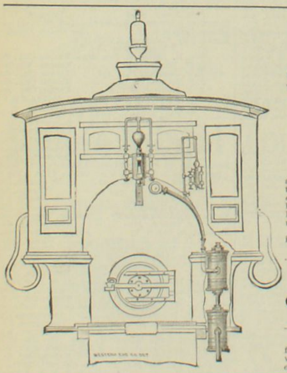
“SWIFT” LUBRICATOR COMPANY, ELMIRA, N. Y.



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SIGHT FEED LUBRICATORS,

For Locomotive Cylinders and Air-Pumps.

The attention of railroad men is invited to the Detroit Lubricator Co.'s Patent Sight Feed Lubricators, for oiling locomotive valves and cylinders, and the Westinghouse Air Pump. Both cups are placed within the cab. The valve cup has a double sight feed, each of which is connected to the right and left hand steam chests, by means of the so-called “tallow pipes,” running beneath the jacket, thus securing *independent lubrication to each steam chest and cylinder from the one cup.* The oil is shown passing in drops through each sight feed glass to the parts to be lubricated, and can be regulated to feed fast or slow. *The feed is regular and continuous, going up or down grade, whether pressure is on or off*, thus securing perfect lubrication at all times. What is said in reference to the valve cup, is equally true in regard to our lubricator for the Westinghouse Pump. By the use of these cups, the saving in wear and tear of machinery and the additional power gained is simply wonderful, as is proved by actual results.*

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* Numerous examples can be furnished where engines have run *two years and over, without having had their valves faced.* The average mileage for the air-brake lubricator is 500 to 1,500 miles to the ½ pint, and examples can be given where this mileage has been greatly exceeded, among which is one of 1,612 *miles with a ½ pint* of oil on a daily run of 208 miles with 64 stops. This pump has run *nine months without having had 25 cents expended on it for repairs.*

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Lake Erie & Western Ry. 4-8½ g. 388 m. 53 lo. 1,701 c.
J. H. Cheney, *Gen. Man*..... Bloomington, Ill.
D. S. Hill, *Gen. Supt*.......Bloomington, Ill.
T. H. Perry, *Pur. Agt*.......Bloomington, Ill.
H. L. Cooper, *Supt. of Equipment*....Lima, O.
Lake George & Muskegon River R. R.
4-8½ g. 20 m. 4 lo. 79 cars.
W. S. Gerrish, *Gen. Man*....Muskegon, Mich.
Lake Shore & Michigan So'n Ry.
4-8½ g. 1,340 m. 547 lo. 17,115 cars.
John Newell, *Gen. Man*..........Cleveland, O.
P. P. Wright, *Gen. Supt*.........Cleveland, O
A. C. Armstrong, *Pur. Agt*........Cleveland, O
G. W. Stevens, *Supt. M. P*........Cleveland, O.
John Kirby, *Gen. M. C. B*.........Cleveland, O.
East'n Div.: C. B. Couch, *Supt*.....Cleveland, O.
J. S. Graham, *M. M*...........Buffalo, N. Y.
A. C. Robson, *M. C. B*..........Buffalo, N. Y.
L. O. Gassett, *M. M*............Cleveland, O.
J. Withycombe, *M. C. B*..........Cleveland, O.
Frank. Div.: G. H. McIntire, *Supt.* Youngstown, O.
Toledo Div.: Thos. Flesher, Jr., *Supt.* Cleveland, O.
J. M. Sanborn, *M. M*..............Norwalk, O.
W. O. Smith, *M. C. B*.............Norwalk, O.
Mich. Divs.: J. E. Curtis, *Supt*......... Toledo, O.
Det. Brs.: T. J. Charlesworth, *Supt.* Detroit, Mich.
Lansing, Ypsilanti & Ft. Wayne Branches.
W. H. Caniff, *Supt*.............Hillsdale, Mich.
Western Div.: A. G. Amsden, *Supt*...Chicago, Ill.
W. L. Gilmore, *M. M*............Elkhart, Ind.
Frank O. Bray, *M. C. B*..........Adrian, Mich.
Gr. Rap. Br.: M. E. Wattles, *Supt.* Kalamazoo, Mich.
Lake Tahoe R. R. 3 g. 10 m. 3 lo. 49 cars.
D. L. Bliss, *Gen. Man*..........Carson, Nev.
John T. Rogers, *Gen. Supt*......Carson, Nev.
Geo. R. Lindsay, *M. M*...........Carson, Nev.
Leavenworth, Topeka & So. W'n Ry. (*See A. T. & S. F.*)
Lebanon Springs R. R. 4-8½ g. 58 m. 5 lo. 44 c.
W. C. Alstyne, *Gen. Man*...... Albany, N. Y.
W. H. Hawkins, *Pur. Agt*........Albany, N. Y.
Geo. Tefft, *M. M*................Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 495 m. 392 lo. 36,998 c.
H. S. Goodwin, *Gen. Supt*.......Bethlehem, Pa.
W. C. Alderson, *Pur. Agt*.....Philadelphia, Pa.
John I. Kinsey, *M. M*............So. Easton, Pa.
John S. Lentz, *M. C. B*.........Packerton, Pa.
N. J. Div.: Jas. Donnelly, *Supt.* Perth Amboy, N. J.
Coal Rds.: J. I. Blakeslee, *Supt.* Mauch Chunk, Pa.
D. Clark, *M. M*...................Hazleton, Pa.
John Campbell, *M. M*..............Delano, Pa.
B. M. Div.: A. G. Brodhead, *S.* Mauch Chunk, Pa.
P. Hofecker, *M. M*..............Weatherly, Pa.
Wy. Div.: A. Mitchell, *S. & M. M.* Wilkesbarre, Pa.
Pa. & N. Y.; and Geneva, Ithaca & Sayre R. Rs.
Wm. Stevenson, *Gen. Supt*.........Sayre, Pa.
J. N. Weaver, *M. M*...............Sayre, Pa.
Lehigh & Hudson River Ry. 4-8½ g. 63 m. 8 lo. 350 c.
Grinnell Burt, *Gen Man*........Warwick, N. Y.
N. L. Furman, *Supt*..............Warwick, N. Y.
John Sayre, *Pur. Agt*...........Warwick, N. Y.
N. L. Furman, *Supt*..............Warwick, N. Y.
S. Mills, *M. M*...................Warwick, N. Y.
Lehigh & Lackawanna and Lehigh & Susquehanna R. Rs. (*See Phil. & Read.; N. J. Cen. Div.*)
Levis & Kennebec R. R. (*See Quebec Cen.*)
Ligonier Valley R. R. 4-9 g. 11 m. 2 lo. 22 cars.
Thos. A. Mellon, *Gen. Manager*.. Pittsburg, Pa.
Geo. Senft, *Supt. & P. Agt*........Latrobe, Pa.
Little Miami R. R. (*See Penna. Co.'s Rds.; (8) Div.*)
Little Rock, Miss. River & Texas Ry.
4-8½ g. 170 m. 12 lo. 299 cars.
H. Wood, *Gen Man*...........Little Rock, Ark.
F. A. Lister, *Gen. Supt*........Little Rock, Ark.
F. Hufsmith, *M. M. & C. B.* Arkansas City, Ark.
Little Rock & Fort Smith. 4-8½ g. 170 m. 13 lo. 360 c.
Hy. Wood, *Gen. Man*..........Little Rock, Ark.
F. A. Lister, *Gen. Supt*.........Little Rock, Ark.
F. Hufsmith, *M. M. & M. C. B*.....Argenta, Ark.
Little Saw Mill Run R. R. 3 & 4-8½ g. 8 m. 4 lo. 327 c.
T. Hartley, *Gen. Man*...........Banksville, Pa.
Long Island R. R. 4-8½ g. 352 m. 92 lo. 953 cars.
I. D. Barton, *Gen. Supt.* Long Island City, N. Y.
Benj. Norton, *Pur. Agt.* Long Island City, N. Y.
C. A. Thompson, *M. M.* Long Island City, N. Y.
Longview & Sabine Valley R. R. (*See Gal. Sab. & St. L.*)
Louisiana W'n R. R. (*See Cen. Pac.; G., H. & S. A. Div.*)
Louisville, Cin. & Lexington R. R. (*See Louis. & N.*)
Louis., Evans. & St. L. Ry. 4-8½ g. 254 m. 24 lo. 1,032 c.
Geo. T. Evans, *Gen. Man*.......Louisville, Ky.
W. H. Field, *Pur. Agt*...........Louisville, Ky.
Geo. N. Sceets, *M. M*...........Evansville, Ind.
Louisville, New Albany & Chicago Ry.
4-8½ g. 470 miles 56 lo. 3,700 cars.
John MacLeod, *Gen. Supt*.......Louisville, Ky.
H. O. Nourse, *Pur. Agt*..........Louisville, Ky
Josiah Bettis, *M. M. & C. B*...New Albany, Ind.
Nor. Div.: W. G. Sala, *Supt*..........Chicago, Ill.
So. Div.: W. N. Marshall, *Supt.* New Albany, Ind.
Louisville, New Orleans & Tex. Ry. 450 m. In progress.
R. T. Wilson, *Dir.* 2 Exchange Ct., New York.
Louisville & Nashville R. R.
5 g. 2,186 m. 380 lo. 12,197 cars.
B. Dunham, *Gen Man*...........Louisville, Ky.
J. T. Harahan, *Gen. Supt*........Louisville, Ky.
W. P. Harris, *Supt*...............Louisville, Ky.
P. P. Huston, *Pur. Agt*...........Louisville, Ky.
Reuben Wells, *Supt. Mach*.......Louisville, Ky.
Louisv., Cin. & Lex. Divs.:
J. G. Metcalf, *Supt. Trans*.......Louisville, Ky.
P. Leeds, *M. M*...................Louisville, Ky.
J. W. Luttrell, *M. M*.............Louisville, Ky.
J. G. Clifford, *M. M.* (2d & C. Div.). Bowling Grn. Ky.
Henderson Div.: L. Hege, *Supt*...Henderson, Ky.
W. P. Pike, *M. M*................Nashville, Tenn.
Nash. & D. Div.: J. Geddes, *Supt.* Nashville, Tenn.
S. & N. A. Div.: E. Marsh, *Supt.* Birmingham, Ala.
C. W. White, *M. M*.........Birmingham, Ala.
Mob. & M.; N. Div. Pens. & Sel.; Sl. & Mont. R. Rs.:
M. S. Belknap, *Supt*..........Montgomery, Ala.
J. N. Hall, *M. M.* (Mont. Shops). Montgomery, Ala.
N. O. Div.: O. M. Dunn, *Supt*....New Orleans, La.
Wm. Adair, *M. M*....................Mobile, Ala.
Memp. Div.: W. Colcamp, *Supt.* Memphis, Tenn.
J. V. Slusser, *M. M*..............Memphis, Tenn.
St. L. Div.: C. O. Parker, *Supt.* Montgomery, Ala.
Thos. Walsh, *M. M*............Mt. Vernon, Ill
Pensacola and So. Div. Pens. & Selma Rds.:
E. O. Saltmarsh, *Supt*...........Pensacola, Fla.
W. D. Robb, *M. M*................Pensacola, Fla.
Louisville & Wadley R. R. 5 g. 10 m. 1 lo. 5 c.
J. H. Wilkins, *Supt. & Pur. Agt* Louisville, Ga.

M

Macon & Brunswick R. R.
(*See E. Tenn., Vir. & Ga.; At. & Ga. Divs.*)
Maine Central R. R. 4-8½ g. 465 m. 59 lo. 1,345 c.
Payson Tucker, *Gen. Man*.........Portland, Me.
Ira K. Russell, *M. M*............Waterville, Me.
C. H. Kenison, *M. C. B*............Augusta, Me.
Eastern Maine. 3 g. 19 m. 2 lo. 40 c.
L. L. Lincoln, *Supt*..............Portland, Me.
Manchester & Keene R. R. 4-8½ g. 30 m. (*See Concord.*)
Manchester & Lawrence R. R. (*See Concord.*)
Manchester & North Weare R. R. (*See Concord.*)
Manhattan Ry. 4-8½ g. 32 m. 228 lo. 652 pass. c.
Frank K. Hain, *Gen. Man*.....New York, N. Y.
W. T. Goundie, *Supt. Trans*. New York, N. Y.
T. W. Peeples, *M. M*...........New York, N. Y.
H. A. Webster, *M. C. B*........New York, N. Y.
Manhattan, Alma & Burlingame Ry. (*See A., T. & S. F.*)
Manitoba Southwestern Colonization Ry.
4-8½ g. 52 m. 3 lo. 125 cars.
J. M. Eagan, *Gen. Supt*..........Winnipeg, Man.
Chas. Newell, *M. M*.............Winnipeg, Man.
Marietta & Cincinnati R. R. (*See Cin. Wash. & Balt.*)
Marietta & North Georgia R. R. 3 g. 60 m. 3 lo. 7 c.
J. B. Glover, *Supt. & P. Agt*.....Marietta, Ga.
E. A. Withers, *M. M*..............Marietta, Ga.
Marquette, Houghton & Ontonagon R. R.
4-8½ g. 100 m. 42 lo. 2,530 cars.
Samuel Schoch, *Gen. Man*.....Marquette, Mich.
M. B. McGee, *Pur. Agt*........Marquette, Mich.
W. A. Thompson, *M. M*.......Marquette, Mich.
H. D. Lyons, *M. C. B*.........Marquette, Mich.
Maryland Central R. R. 3 g. 27 m. 4 lo. 56 cars.
S. G. Boyd, *Supt*..............Baltimore, Md.
Massachusetts Central R. R. 4-8½ g. 48 m. 5 l. 81 c.
E. G. Allen, *Supt. & Pur. Agt*....Boston, Mass.
E. A. Walker, *M. M*........So. Sudbury, Mass.

McComb, Deshler & Toledo R. R.
(*See Cin., Ham. & Day.; D. & M. Div.*)
Meadville Ry. (*See Penna. Co.'s Rds.; (2) Div.*)
Memphis & Charleston R. R. (*See E. Tenn. Va. & Ga.*.
Memphis & Lit. Rock R. R. 5 g. 135 m. 14 lo. 299 c.
E. K. Sibley, *G. Man. & P. A.*. Little Rock, Ark.
H. G. Fleming, *Supt*...........Memphis, Tenn.
Thos. Rennell, *M. M*...............Argenta, Ark.
T. Rennell, *M. C. B*...............Argenta, Ark.
Mexican Ry. 4-8½ g. 293 m. 42 lo. 616 cars.
E. W. Jackson, *Gen. Man*........Mexico, Mex.
Mexican Central Ry. 4-8½ g. 680 m. 73 lo. 818 c.
D. B. Robinson, *Gen. Man*.....City of Mexico.
D. Mackenzie, *G. Supt*........City of Mexico.
Theo. Nickerson, *Pur. Agt*. Boston, Mass.
F. W. Johnstone, *Supt. M. P. & M.* City of Mex.
J. H. O'Brien, *M. C. B*.........City of Mexico.
J. G. McCuen, *M. M*.............El Paso, Tex.
1st Div.: G. T. Jarvis, *Supt*.....City of Mexico.
2d Div.: J. H. Smith, *Supt*...........Silas, Mex.
3d Div.: Wm. Davis, *Supt*.......Jimulco, Mex.
4th Div.: R. E. Comfort, *Supt.* Paso Del Norte, Mex.
Mexican National Ry. 3 g. 766 m. 50 lo. 1,283 c.
Texas Mexican Ry. 3 g. 171 m. 10 lo. 212 c.
R. C. Peebles, *Supt*.................Mexico, Mex.
W. F. Baldwin, *Asst. Supt*...........Laredo, Tex.
Galv. Div. T. M. Ry.: M. Quin, *Supt.* Galveston, Tex.
No. Div. Mex. Nat. Ry. & So. Div. Tex.-Mex. Ry.
C. A. Merriam, *Supt*............Laredo, Texas.
Jno. Harding, *M. M. & C. B.* Corpus Christi, Tex.
So. Div. M. N. Ry.: W. E. Lewis, *Supt.* Mexico, Mex.
J. M. Winslow, *M. M*..............Mexico, Mex.
Mat. Div.: F. E. Butterfield, *Supt.* Matamoras, Mex
Mexican, Oriental, Inter-Oceanic & International R. R. 1,400 miles. In progress.
G. M. Dodge, *Pres.* 195 B'way, New York, N. Y.
Michigan Cen. R. R. 4-8½ g. 1,485 m. 357 lo. 11,284 c.
H. B. Ledyard, *Pres. & Gen. Man.* Detroit, Mich.
Allan Bourn, *Pur. Agt*..........Detroit, Mich.
S. H. Edgerly, *Gen. M. M*.......Jackson, Mich.
Robert Miller, *Gen. M. C. B*.....Detroit, Mich.
(1) Lines West of Detroit River:
E. C. Brown, *Gen. Supt*.........Detroit, Mich.
East. Div.: D. S. Sutherland, *Supt.* Detroit, Mich.
Bay City, Saginaw & Mackinaw Divisions.:
W. A. Vaughan, *Supt*.........Bay City, Mich.
C. E. Smart, *M. M*.............Bay City, Mich.
Main Line: Gr. Rap.; So. Bend; and So. Hav. Divs.:
C. B. Bush, *Supt*.............Jackson, Mich.
W'n Divs.: R. H. L'Hommedieu, *Supt.* Chicago, Ill.
(2) Lines East of Detroit River:
Wm. H. Perry, *Agt*...........Buffalo, N. Y.
J. E. Morford, *Supt*.........St. Thomas, Ont.
A. Bull, *M. M*................St. Thomas, Ont.
Rob't Potts, *M. C. B*.........St. Thomas, Ont.
Michigan & Ohio.
Luther Allen, *Supt*...................Toledo, O.
H. H. Mitchell, *Pur. Agt*.............Toledo, O.
D. J. Durrell, *M. M*.............Marshall, Mich.
Middleburg & Schoharie; and
Schoharie Valley R. Rs. 4-8½ g. 11 m. 2 lo. 6 cars.
P. S. Danforth, *Gen. Supt*... Middleburg, N. Y.
Midland of Canada. (*See Grand Trunk.*)
Midland No. Carolina Ry. 5 g. 95 m. 9 lo. 82 cars.
Atlantic & North Carolina Ry. 22 m.
John D. Whitford, *Gen. Man*..Newbern, N. C.
J. A. Bryan, *Supt*...............Newbern, N. C
D. J. Sprague, *Pur. Agt*........New York, N. Y.
B. Manly, *Supt. of Mach*..........Newbern, N. C.
Milwaukee, Lake Shore & Western Ry.
4-8½ g. 370 m. 45 lo. 1,536 cars.
H. G. H. Reed, *Gen. Man. & P. Agt.* Milwaukee, Wis
J. Donahue, *Supt*................Milwaukee, Wis.
David B. Curtis, *Asst. Supt*..... Oshkosh, Wis
John Hickey, *M. M*...............Ledyard, Wis.
Milwaukee & Northern and Wisconsin & Michigan R. Rds. 4-8½ g. 228 m. 24 l. 703 cars.
C. F. Dutton, *Gen. Supt*.........Milwaukee, Wis.
N. S. Kimball, *M. M*...........Ft. Howard, Wis.
Mineral Range R. R. 3 g. 13 m. 4 lo. 43 cars
Chas. E. Holland, *Pr. & Supt*...Hancock, Mich.
W. H. Carr, *Pur. Agt*.............Hancock, Mich.
T. J. Shellhorn, *M. M. & C. B*..Hancock, Mich.
Minneapolis, Lyndale & Minnetonka Ry.
3 g. 20 miles 4 motors 1 lo. 35 cars.
William McCrory, *Man*.....Minneapolis, Minn.
T. W. Heintzelman, *M. M*.. Minneapolis, Minn.
Mississippi, Terre Aux Boeufs & Lake R. R.
29 miles.
M. R. Spelman, *Supt*..........New Orleans, La.
Mississippi & Tenn. R. R. 4-8½ g. 101 m. 12 lo. 194 c.
M. Burke, *Gen. Supt*..............Memphis, Tenn.
J. C. Ramsey, *M. M*...............Memphis, Tenn.
S. J. Bolton, *M. C. B*.............Memphis, Tenn.
Missouri, Kansas & Texas Ry. (*See Mo. Pac.; (2) Div.*)
Missouri Pacific Ry. (Leased and operated lines.)
4-8½ g. 6,029 m. 697 lo. 19,748 cars.
A. A. Talmage, *4th V. Pres*......St. Louis, Mo.
R. B. Lyle, *Pur. Agt*..............St. Louis, Mo.
(1), (2) and (3) Divs.:
John Hewitt, *Supt. M. P. & M.*..St. Louis, Mo.
John Hodge, *Supt. Car Dep*........St. Louis, Mo.
(4), (5) and (6) Divs.:
O. A. Haynes, *S. M. P. & M.*....Marshall, Tex.
(1) Missouri Pacific Ry. 1,028 m. 155 lo. 4,218 cars.
A. M. Hager, *Supt*....................Sedalia, Mo.
E. Taylor, *M. M*.......................Sedalia, Mo.
W'n Div.: W. W. Fagan, *Supt*......Atchison, Kan.
(2) Mo., Kan. & Tex. Ry. 1,308 m. 140 lo. 4,248 cars.
S. Irvin, *Asst. Supt. Car Dep*.......Sedalia, Mo.
J. B. Vandyne, *Supt*.............Parsons, Kan.
J. W. Haines, *M. M*...............Parsons, Kan.
(3) Central Branch Un. Pac. R. R. 388 m. 30 lo. 599 c.
W. W. Fagan, *Supt*..............Atchison, Kan.
H. V. Faries, *M. M*..............Atchison, Kan.
J. W. Blackburn, *A. Supt. Car D.*. Atchison, Kan.
(4) St. L., I. Mt. & So'n Ry. 905 m. 138 lo. 4,928 c.
Wm. Kerrigan, *Supt*...............St. Louis, Mo.
St. Louis Div.: W. H. Harris, *M. M.* De Soto, Mo.
Ark. Div.: J. J. Frey, *Supt*.......Little Rock, Ark.
R. M. Richardson, *M. M*.....Little Rock, Ark.
(5) Int. & G. No.: John Herrin, *Supt*.. Palestine, Tex.
W. S. Morris, *M. M*............Palestine, Tex.
(6) Tex. & Pac.: W. Cummings, *Supt.* Marshall, Tex.
E. N. O. & Tr. Cont. Divs.:
Geo. Dimick, *Supt*...............Marshall, Tex.
E. A. Haggerty, *M. M*..........Marshall, Tex.
E. R. Smith, *M. M. & M. C. B*.. N. Orleans, La.
Rio Grande Div.:
D. Flannigan, *Supt*..........Big Springs, Tex.
E. A. Salisbury, *M. M*......Big Springs, Tex.
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 23 c.
Wm. H. Pratt, *Trustee*...............Mobile, Ala
Mobile & Girard R. R. 5 g. 84 m. 7 lo. 112 cars.
W. L. Clark, *Gen Supt*...........Columbus, Ga.
J. C. Albrecht, *M. M*............Columbus, Ga.
A. J. Nix, *M. C. B*...............Columbus, Ga.
Mobile & Montgomery Ry. (*See Louis. & Nash.*)
Mobile & Northwestern R. R. 3 g. 31 m. 2 lo. 16 c.
Thomas T. A. Lyon, *Pres*.......Glendale, Miss.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,353 cars.
G. Jordan, *V. Pr. & Gen. Man*.....Mobile, Ala.
F. Jordan, *Pur. Agt*..................Mobile, Ala.
M. T. Carson, *Gen. M. M*..........Whistler, Ala.
J. T. Booth, *M. C. B*...............Whistler, Ala.
So'n Div.: J. G. Motley, *Supt*........Mobile, Ala.
L. J. Morris, *M. M*................Macon, Miss.
No'n Div.: E. S. Hosford, *Supt*.. Jackson, Tenn.
H. C. Goode, *M. M*............Jackson, Tenn.
Mobile & Spring Hill R. R. 5-2 g. 8 m. 1 lo. 16 cars.
F. Ingate, *Manager*....................Mobile, Ala.
Moline & Southeastern R. R. 3-6 g. 8 m. 2 lo. 26 c.
R. Battersly, *Gen. Man*..........Coal Valley, Ill.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 8 cars.
G. B. Wiestling, *Supt. & P. A*....Mont Alto, Pa.
Montgomery & Eufaula Ry. (*See Cen. of Ga.*)
Montgomery Southern Ry. 3 g. 20 m. 1 lo. 15 cars.
S. D. Hubbard, Jr., *Gen. Man.* Montgomery, Ala.
Montour R. R. 4-8½ g. 12 m. 2 lo. 130 cars.
C. R. Brown, *Supt. & Pur. Agt*...Imperial, Pa.
Henry Newman, *M. C. B*.........Imperial, Pa.
Montpelier & Wells Riv. R. R. 4-8½ g. 38 m. 3 lo. 86c.
W. A. Stowell, *Supt*..............Montpelier, Vt.
Montreal, Portland & Boston Ry. (*See Passumpsic.*)
Montreal & Sorel Ry. 4-8½ g. 47 m. 3 lo. 35 c.
C. N. Armstrong, *G. M. & Pur. Agt.* Sorel, Que.
J. F. Armstrong, *Gen. Supt*..........Sorel, Que.
G. W. Pangborn, *M. M*...............Sorel, Que.

Montrose Ry. 3 g. 28 m. 3 lo. 24 cars.
T. G. Walter, *Gen. Supt*... Tunkhannock, Pa.
Morgan's Louis. & Tex. R. R. 4-8½ g. 242 m. 46 l. 1,339 c.
J. Kruttschnitt, *Supt*........New Orleans, La.
C. Trumpy, *Pur. Agt*..........New Orleans, La.
Jas. D. Connell, *M. M*...............Algiers, La.
Jno. Hildebrand, *M. C. B*...........Algiers, La.
Mount Washington R. R. 5-3 g. 3 m. 6 lo. 6 cars.
Walter Aiken, *Gen. Man*.........Franklin, N. H.
Muncy Creek Ry. (*See Wmspt. & No. Br.*)

N

Nantasket Beach R. R. 4-8½ g. 6 m. 5 lo. 25 c.
George L. Keyes, *Gen. Supt*......Boston, Mass.
Naugatuck R. R. 3 g. 4 m. 17 lo. 547 cars.
Geo. W. Beach, *Supt*.........Waterbury, Conn.
H. A. Bishop, *Pur. Agt*.......Bridgeport, Conn.
H'y D. Beach, *Supt. R. S*....Bridgeport, Conn.
Napanee, Tamworth & Quebec Ry. In progress.
Ed. W. Rathbun, *Man. Dir*....Deseronto, Ont
R. C. Carter, *Supt*..............Deseronto, Ont.
Narragansett Pier R. R. 4-8½ g. 8 m. 2 lo. 11 c.
G. T. Lanphear, *Supt. & Pur. Agt.* Peacedale, R. I.
Nashua & Rochester R. R. (*See Wor. & Nash.*)
Nashville, Chattanooga & St. Louis Ry.
5 g. 539 miles 87 lo. 1,979 cars.
J. W. Thomas, *G. Man. & P. Agt.* Nashville, Tenn.
M. J. C. Wrenne, *Supt*........Nashville, Tenn.
James Cullen, *M. M. & C. B*...Nashville, Tenn.
Nashville & Florence R. R. 5 g. 20 m.
J. T. Craik, *Supt*...............Columbia, Tenn.
Natchez, Jackson & Col. R. R. 3-6 g. 100 m. 7 lo. 92 c.
E. D. Frost, *Gen. Supt*.......... Natchez, Miss.
National Car Company. 4,000 freight cars.
L. Millis, *Pres*.......................Boston, Mass.
F. Stewart Stranahan, *Sec. & Tr.* St. Albans, Vt.
John B. Fletcher, *Supt*.........St. Albans, Vt.
Nebraska, Topeka, Iola & Memphis R. R. 4-8½ g. 16 m.
H. M. Clarke, *Gen. Man*...........Girard, Kan.
C. H. Malin, *Gen. Supt*.............Girard, Kan.
Nevada Central R. R. (*See Union Pac.; (7) Div.*)
Nevada County N. G. R. R. 3 g. 23 m. 3 lo. 46 cars.
John F. Kidder, *Supt*.........Grass Valley, Cal.
Jas. McCormick, *M. M. & C. B.* Grass Valley, Cal.
Nevada & Oregon R. R. 3 g. 30 m. 25 cars.
D. W. Balch, *Supt*........................Reno, Nev.
New Brunswick Ry. 4-8½ g. 419 m. 20 lo. 357 cars.
E. R. Burpee, *Gen. Man*.....Woodstock, N. B.
Jesse Mathews, *M. M*.............Gibson, N. B.
T. N. Burpee, *M. C. B*.............Gibson, N. B.
J. J. Seely, *Pur. Agt*..............Gibson, N. B.
Thos. Armstrong, *M. M*.... St. Andrew's, N. B.
G. Houlton, *M. C. B*.......St. Andrew's, N. B.
New Brunswick & Can. Ry. (*See New Brun.*)
New Castle R. R. 3-6 g. 5 m. 2 lo. 76 cars.
Geo. Pearson, *Gen. Man*........New Castle, Pa.
New Castle & Beaver Valley R. R. (*See Penna. Co.*)
New Haven & Derby R. R. 4-8½ g. 13 m. 4 lo. 70 c.
E. S. Quintard, *Supt*..........New Haven, Conn.
J. M. Whitlock, *M. M. & C. B.* New Haven, Conn.
New Haven & No'mpton. 4-8½ g. 170 m. 27 lo. 598 c.
S. B. Opdyke, Jr., *Supt*.........New Haven, Ct.
R. G. Curtis, *Pur. Agt*............New Haven, Ct.
Henry Fox, *M. M*..................New Haven, Ct.
John Sweeny, *For Car. Shps*...New Haven, Ct.
New Jersey & New York Ry. 4-8½ g. 37 m. 6 lo. 40 c.
J. D. Hasbrouck, *Gen. Man* Jersey City, N. J.
J. S. Drake, *Supt. & M. M*.......Hillsdale, N. J.
L. B. Van Wagonen, *M. C. B*.....Hillsdale, N. J.
N. J. Southern Ry. (*See Phil. & Read.; N. J. So. Div.*)
New London Northern R. R. (*See Central Ver.*)
New Orleans Pacific Ry. (*See Mo. Pac.; (6) Div.*)
New Orleans & Carrollton R. R.
4-8½ g. 15 m. 12 lo. 79 cars.
C. V. Haile, *Supt*.............New Orleans, La.
John Dahmer, *M. M*..........New Orleans, La.
Jas. Thorn, *M. C. B*...........New Orleans, La.
New Orleans & Mobile R. R. (*See Louis. & Nash.*)
N. O. & Northeastern R. R. (*See Cin., N. O. & Tex. Pac.*)
New Orleans & Selma R. R. 5 g. 21 m. 1 lo. 8 cars.
L. B. Schofield, Supt...................Selma, Ala.
N. Y. Central & Hudson River R. R.
4-8½ g. 983 m. 676 lo. 25,161 cars.
J. M. Toucey, *Gen. Supt*....... New York, N. Y.
R. C. Moore, *Pur. Agt*......... New York, N. Y.
Wm. Buchanan, *Supt. M. P*... New York, N. Y.
L. Garey, *Supt. Car Dept*..... New York, N. Y.
N. Y. & Har. Div.: C. M. Bissell, *Supt.* do.
P. McQ. Gibson, *M. M*........New York, N. Y.
C. E. Garey, *M. C. B*.........Morrisania, N. Y.
Hud. Riv. Div.: C. M. Bissell, *Supt.* N. York, N. Y.
Peter Smith, *M. C. B*.........New York, N. Y.
E'n Div.: Zenas C. Priest, *Supt*.....Utica, N. Y.
John Ortton, *M. M*.........West Albany, N. Y.
L. Packard, *M. C. B*......West Albany, N. Y.
W'n Div.: Geo. H. Burrows, *Supt.* Rochester, N. Y.
S. L. White, *M. M*..............Syracuse, N. Y.
Amos Gould, *M. M*...............E. Buffalo, N. Y.
E. Chamberlain, *M. C. B*.... E. Buffalo, N. Y.
C. H. Burchard, *M. C. B*..E. Rochester, N. Y.
Rd. Donaby, *M. C. B*....Niagara Falls, N. Y.
N. Y. Chic. & St. L. Ry. 4-8½ g. 513 m. 115 lo. 4,838 c.
Lewis Williams, *Gen. Man*.........Cleveland, O.
Jno. Mackenzie, *Supt. M. P*......Cleveland, O.
Eas'tn Div.: G. H. Kimball, *Supt*...Cleveland, O.
E. A. Miller, *M. M*....................Conneaut, O.
West'n Div.: A. H. Evans, *Supt*.......Chicago, Ill.
Jas. Eckford, *M. M*...................Bellevue, O.
New York City & Northern. 4-8½ g. 54 m. 17 lo. 368 c.
Frank S. Gannon, *Gen. Supt.* High Bridge, N. Y.
Tho. Millen, *M. M*.............. High Bridge, N. Y.
New York, Lackawanna & W'n Ry. (*See Del., L. & W.*)
New York, Lake Erie & Western R. R.
E. S. Bowen, *V. Pr*...............New York, N. Y.
(1) N. Y., L. E. & W. Div.: 4-8½ g. 1,073 m. 576 lo. 30,553 c.
B. Thomas, *Gen. Supt*...........Jersey City, N. J.
J. A. Hardenburgh, *Pur. Agt.* New York, N. Y.
F. M. Wilder, *Supt. M. P. & M*...Susqueh'a, Pa.
E'n Div.: E. O. Hill, *Supt*.......Jersey City, N. J.
J. H. Vreeland, *M. M*.......Jersey City, N. J
J. N. Mileham, *M. C. B*.....Jersey City, N. J.
Del. Div.: W. J. Murphy, *Supt*..Port Jervis, N. Y.
J. Van Vechten, *M. M. & C. B.* Pt. Jervis, N. Y.
Susq. Div.: J. Jolls, *Supt*..............Elmira, N. Y.
V. Blackburn, *M. M*.........Susquehanna, Pa.
D. B. Goodell, *M. C. B*...............Elmira, N. Y.
Buf. & R. Divs.: Chas. Neilson, *Supt.*; and
G. B. Ross, *M. M*...................Buffalo, N. Y.
M. Wilder, *M. C. B*...............Buffalo, N. Y.
B. & S.-W. Div.: C. A. Brunn, *Supt* do.
W'n Div.: W. B. Coffin, *Supt*..Hornellsville, N. Y.
Geo. H. Griggs, *M. M*.......Hornellsville, N. Y
N. Y. & Greenwood L. Ry. 4-8½ g. 44 m. 8 lo. 53 c.
Stephen Smith, *Supt*...........Jersey City, N. J.
F. A. Stinard, *M. M*................Pompton, N. J.
(2) N. Y., Pa. & O. Div.: 4-8½ g. 565 m. 221 lo. 7,794 c.
J. M. Ferris, *Gen. Supt*..........Cleveland, Ohio.
J. H. Holway, *Pur. Agt*........Cleveland, Ohio.
Wm. Fuller, *Gen. M. M. & C. B*...Cleveland, O.
S. V. Smith, *Asst. Gen. M. C. B*.....Kent, Ohio.
E'n Div.: A. L. Dunbar, *Supt*.......Meadville, Pa.
J. A. Cooper, *M. M*................Meadville, Pa.
D. S. Dockstader, *M. C. Rep*...Meadville, Pa
W'n Div.: T. A. Phillips, *Supt*............Galion, O.
Wm Hill, *M. M*............................Galion, O.
J. W. Holmes, *For. Car Rep*...........Galion, O.
Geo. Wilson, *For. Car Rep*.... Dayton, Ohio.
Maho'g Div.: N. F. Wood, *Supt*........Cleveland, O.
N. Wright, *M. M*.......................Cleveland, O.
C. N. Thorp, *M. C. Rep*................Cleveland, O.
New York, New Haven & Hartford R. R.
4-8½ g. 203 m. 123 lo. 2,768 cars.
E. M. Reed, *V. P. & Gen. Man*..New Haven, Ct.
R. N. Dowd, *Pur. Agt*..............New Haven, Ct.
N. Y. & N. H. Div.: W. H. Stevenson, *Supt*...N. Y.
Shore Line and Air Line Divs.:
O. M. Shepard, *Supt*............. N. Haven, Ct.
H. Kettendorf, *Supt. M. P*...New Haven, Ct.
Jas. Denver, *M. C. B*............New Haven, Ct.
Hart. Div.: C. S. Davidson, *Supt*....Hartford, Ct.
John Henny, Jr., *Supt. M. P. & M. C. B*.... do.
N. Y., Ontario & Western Ry. (*See N. Y., W. Sh. & Buf.*)
N. Y., Pittsb'h & Chicago. 4-8½ g. 20 m. 2 lo. 32 c.
Geo. W. Dixon, *Supt*..............New Galilee, Pa.
H. T. Hanna, *Pur. Agt*............Pittsburgh, Pa.
N. Y., Pennsylvania & Ohio R. R. (*See N. Y., L. E. & W.*)
New York, Philadelphia & Norfolk R. R.
4-8½ g. 10 m. 1 lo. 4 cars.
J. L. Bates, *Supt*........Pocomoke City, Md.

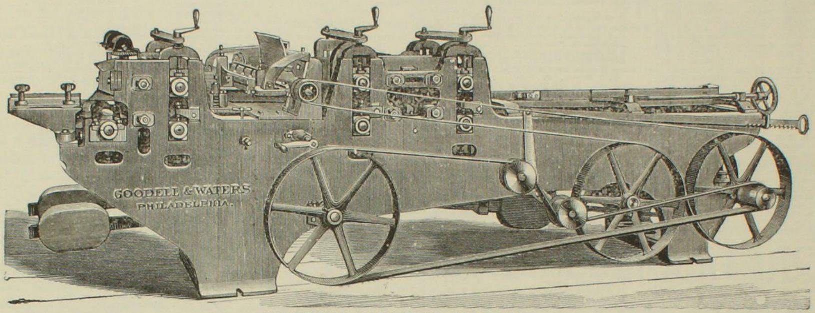
New York, Providence & Boston R. R.
4-8½ g. 83 m. 29 lo. 430 cars.
J. B. Gardner, *Supt*..............Providence, R. I.
Giles F. Ward, *Pur. Agt*......Stonington, Conn.
J. H. Anderson, *M. M. & C. B.* Providence, R. I.
N. Y., Susqueh'na & W'n. 4-9 g. 147 m. 33 lo. 1,469 c.
F. A. Potts, *Gen. Man*..........New York, N. Y.
C. D. McKelvey, *Asst. Supt.* Jersey City, N. J.
C. T. Demarest, *Pur. Agt*.....New York, N. Y.
W. C. Ennis, *M. M. & C. B*...Wortendyke, N. J.
New York, Texas & Mexican Ry.
4-8½ g. 92 m. 6 lo. 95 cars.
Allen McCoy, *Gen. Man*...........Victoria, Tex.
J. G. Conlon, *M. M*.................Victoria, Tex.
New York, West Shore & Buffalo.
4-8½ g. 850 m. 98 lo. 2,907 c.
J. D. Layng, *Gen. Man*.........New York, N. Y.
C. D. Gorham, *Asst. Gen. Supt.* Weehawken, N. J.
P. S. Bemis, *Pur. Agt*...........New York, N. Y.
R. H. Soule, *Supt. M. P*........Frankfort, N. Y.
H. R. Div.: C. W. Bradley, *Supt.*,
Weehawken, N. J
Harry Linn, *M. M*.........New Durham, N. J.
Moh'k Div.: H. W. Gardiner, *Supt.* Syracuse, N. Y.
Buff. Div.: F. E. Merrill, *Supt*.......Buffalo, N. Y.
New York, Ontario & Western.
J. E. Childs, *Gen. Supt*...........New York, N. Y.
N. Y. Woodhaven & Rockaway R. R. (*See Long Is.*)
N. Y. & Greenwood Lake Ry. (*See N. Y., L. E. & W.*)
N. Y. & Manhattan Beach Ry. (*See Long Island.*)
New York & Long Branch R. R. (*See Phil. & Read.*)
New York & New England R. R.
4-8½ g. 473 m. 145 lo. 3,959 cars.
W. W. McKim, *Pur. Agt*............Boston, Mass.
Geo. E. Boyden, *M. M*..........Norwood, Mass.
Elias E. Pratt, *M. C. B*..........Norwood, Mass.
East Div: W. H. Turner, *Supt*.......Boston, Mass.
Nor. Div.: P. St. M. Andrews, *Supt*...Norwich, Ct.
W. A. Stone, *M. M*.....................Norwich, Ct.
Prov. Div.: L. W. Palmer, *Supt*..Providence, R. I.
Hfd. Div.: E. Holbrook, *Supt*........Hartford, Ct.
E. M. Humstone, *M. M*..............Hartford, Ct.
West'n Div.: C. H. Platt, *Supt*.....Fishkill, N. Y.
Woons'kt Div.:
E. N. Tucker, *Supt*...............Needham, Mass.
New York & Sea Beach R. R. 4-8½ g. 6 m. 4 lo. 40 c.
C. W. Douglass, *Supt*...........Bay Ridge, N. Y.
W. A. Sheldon, *Supt*...........Bay Ridge, N. Y.
Newark, Somerset & Straitsville R. R. (*See B. & O.*)
Newburg, Dutchess & Conn. R. R. 4-8½ g. 59 miles.
C. L. Kimball, *Gen. Supt*.....Matteawan, N. Y.
W. G. Van Buskirk, *M. M. & C. B.*,
Dutchess Junction, N. Y.
Newfoundland Ry. 3-6 g. 45 m. 7 lo. 41 c.
C. X. Hobbs, *Gen. Man*.........St. John's, N'f'd.
Norfolk Southern R. R. 4-8½ g. 74 m. 7 lo. 182 c.
M. K. King, *Gen. Man. & Pur. Agt.* Norfolk, Va.
J. S. Whitworth, *M. M. & C. B*.....Norfolk, Va.
Norfolk & Ocean View Narrow Gauge R. R.
3 g. 8 m. 2 lo. 9 cars.
W. H. Taylor, *Pres*.......................Norfolk, Va.
Norfolk & Western R. R. (*See Shenandoah Val.*)
North-Eastern R. R. of Ga. 5 g. 72 m. 2 lo. 20 cars.
H. R. Bernard, *Supt*....................Athens, Ga.
North-Eastern R. R. (S. C.) (*See Wil. & Wel.*)
North Pacific Coast R. R. 3 g. 84 m. 12 lo. 320 cars.
David Nye, *Gen. Supt*...........San Rafael, Cal.
W. F. Russell, *Pur. Agt*....San Francisco, Cal.
J. Fowler, *M. M*..........................Saucelito, Cal.
North Shore Ry. 4-8½ g. 209 m. 21 lo. 564 c.
W. Wainwright, *Gen. Man*.......Montreal, Can.
A. Davis, *Supt. & Pur. Agt*.........Quebec, Can.
Northern (N. H.), and Concord & Claremont Rys.
4-8½ g. 173 m. 25 lo. 569 cars.
Geo. E. Todd, *Supt*...............Concord, N. H.
M. M. & C. B. & Pur. Agt.. do.
Northern (N. J.) R. R. (*See N. Y., L. E. & W'n.*)
Northern Central Ry. (*See Penna. R. R. (6) Div.*)
North'n Pacific R. R. 4-8½ g. 2,207 m. 391 lo. 9,897 c.
T F. Oakes, *Gen. Man*..............St. Paul, Minn.
John H. Ames, *Gen. Pur. Agt*..St. Paul, Minn.
Geo. W. Cushing, *Supt. M. P., M. & R. S.* do.
(1) E'n Div.: J. T. Odell, *A. Gen. Man.* St. Paul, Minn.
H. J. Small, *A. S. Mach*..........Brainerd, Minn.
1st Gr. Div.: M. C. Kimberly, *Supt.* St. Paul, Minn.
Frank Howard, *M. C. B*.......Brainerd, Minn.
2d Grand Div.: J. M. Graham, *Supt*..Fargo, Dak.
C. C. Quinn, *M. M*......................Fargo, Dak.
3d Gd. Div.: D. R. Taylor, *Supt*....Mandan, Dak.
E. F. Doran, *M. M*....................Mandan, Dak.
4th Gr. Div.: S. R. Ainslie, *Supt*..Glendive, Mont
S. L. Bean, *M. M*.................Glendive, Mont.
J. C. Munro, *M. M*.............Livingston, Mont.
(2) W'n Div.: J. M. Buckley, *Asst. Gen. Man.*
New Tacoma, W. T.
H. D. Sanborn, *P. Agt*.............Portland, Ore.
W. T. Small, *A. S. Mach*...........Portland, Ore.
Mo. Div.: B. F. Matthias, *Supt*....Bismark, Dak.
Pac. Div.: Otis Sprague, *Supt.* New Tacoma, W. T.
H. H. Warner, *M. M*.........New Tacoma, W. T.
Idaho Div.: J. B. Cable, *Supt*.....Missoula, Mont.
J. Evans, *M. M*.......................Missoula, Mont.
Ry. Mo. Div.: J. B. Cable, *Supt*..Missoula, Mont.
J. Walsh, *M. M*......................Missoula, Mont.
Northern & North-W'n Rys. 4-8½ g. 378 m. 50 lo. 1,195 c.
James Webster, *Supt*....................Toronto, Can.
W. C. Schreeber, *Pur. Agt*..........Toronto, Can.
P. Clarke, *M. M*...........................Toronto, Can.
Nova Scotia Ry. 4-8½ g. 79 m. 9 lo. 268 c.
C. A. Scott, *Gen. Man*......New Glasgow, N. S.
M. F. Punch, *M. M*.........New Glasgow, N. S.

O

Ogdensburg & Lake Champlain R. R.
4-8½ g. 122 m. 33 lo. 1,694 cars.
A. A. Gaddis, *Gen. Man*.......Ogdensburg, N. Y.
E. B. Burnham, *Pur. Agt*...Ogdensburg, N. Y.
Abr. Klohs, *Supt. & M. M*.........Malone, N. Y.
J. N. Brown, *Master Builder.* Ogdensburg, N. Y.
Ohio Central R. R. 4-8½ g. 325 m. 46 lo. 4,760 cars.
John E. Martin, *Rec*........................Toledo, O.
T. M. Peelar, *Supt*.........................Bucyrus, O.
F. W. Stewart, *Pur. Agt*....................Toledo, O.
J. B. Morgan, *M. M. & C. B*...............Bucyrus, O.
Ohio Southern R. R. (*See Ind., Bloom. & W'n.*)
Ohio & Mississippi Ry. 4-9 g. 616 m. 113 lo. 2,501 cars.
W. W. Peabody, *Gen. Man*.........Cincinnati, O.
G. E. Atwood, *Pur. Agt*..............Cincinnati, O.
J. H. Setchel, *Gen. M. M*..........Cincinnati, O.
Cin. Div.: C. B. Cole, *Supt*..........Seymour, Ind.
John Thumser, *M. M*..............Seymour, Ind.
J. P. Coulter, *M. C. B*..................Aurora, Ind.
Arthur Donaldson, *M. M*........Vincennes, Ind.
St. L. & Sp. Div.: C. M. Stanton, *Supt.* St. Louis, Mo.
J. W. Stokes, *M. M.* (Spring. Div.)..Pana, Ill.
Louisv. Div.: C. B. Cole, *Supt*.........Louisville, Ky.
Oil City & Chicago R. R. (*See Buff., N. Y. & Phil.*)
Old Colony R. R. 4-8½ g. 470 m. 124 lo. 3,527 cars.
J. R. Kendrick, *Gen. Man*...........Boston, Mass.
R. W. Husted, *Pur. Agt*................Boston, Mass.
Jas. N. Lauder, *Supt. M. P*...........Boston, Mass.
Sam. Stevens, *M. C. B*..................Boston, Mass.
Main Li. Div.: J. H. French, *Supt*...Boston, Mass.
C. Berkley Powell, *M. M*..............Boston, Mass.
Cape Cod Div.: C. H. Nye, *Supt*..Hyannis, Mass.
C. Berkley Powell, *M. M*..............Boston, Mass.
No. Div.: S. A. Webber, *Supt*....Fitchburg, Mass.
T. W. Twombly, *M. M*...............Taunton, Mass.
Oregon Ry. & Navigation Co.
3 & 4-8½ g. 577 m. 72 lo. 1,611 cars.
C. H. Prescott, *V. P. & Gen. Man.* Portland, Ore.
F. T. Dodge, *Supt.* (Riv. Div.)....Portland, Ore.
H. S. Rowe, *Supt.* (Ry Div.).......Portland, Ore.
J. M. Drake, *Pur. Agt*................Portland, Ore.
Goodall, Perkins & Co., *Supt.* (Ocean Div.)
San Francisco, Cal.
C. C. Hobart, *Gen. M. M*..........The Dalles, Ore.
Chas. A. Phipps, *M. C. B*.........The Dalles, Ore.
Oregon & California R. R. 4-8½ g. 333 m. 23 lo. 576 c.
R. Koehler, *Act. Man*....................Portland, Ore
J. Brandt, *Gen. Supt*.....................Portland, Ore.
A. Brandt, *M. M*...........................Portland, Ore.
Owensboro & Nashville R. R. 5 g. 44 m. 3 lo. 70 c.
M. Newbold, *Supt*....................Owensboro, Ky.
H. M. Gabel, *M. M. & C. B*.........Owensboro, Ky.
Oxford & Henderson R. R. 4-8½ g. 13 m. 2 lo. 11 c.
James A. White, *Gen. Supt*...Henderson, N. C.
James E. Lawrence, *M. M*... Henderson, N. C.

Goodell & Waters

PHILADELPHIA, PA.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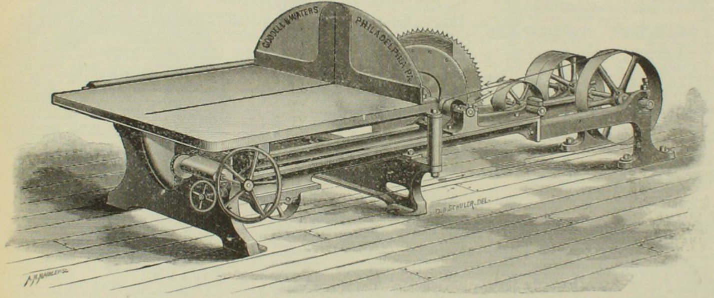
PHILADELPHIA.

KEYSTONE FLOORING MACHINE.


GOODELL & WATERS
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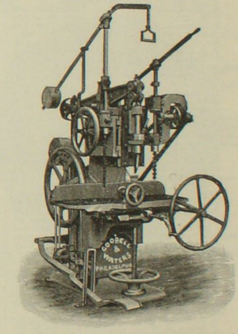
LARGE TRAVERSE CUT-OFF SAW.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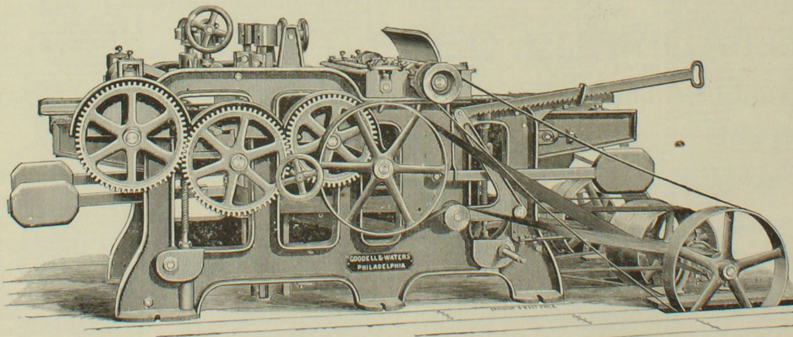
MILLS,
CAR SHOPS,
BRIDGE
BUILDERS,
Etc., Etc.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CAR SILL PLANER AND DOUBLE-SURFACER AND JOINTER.

GOODELL & WATERS,

31st and Chestnut Streets, - - - - PHILADELPHIA, PA.

P

Pacific Coast Ry. 3 g. 64 m.
J. M. Fillmore, *Manager* San Luis Obispo, Cal.
W. H. Masterman, *M. M. & C. B.* do.
Painesville & Youngstown Ry. 3 g. 65 m. 7 lo. 319 c.
R. K. Paige, *Rec. & Man.*........Painesville, O.
J. A. Newcome, *Supt. R. S.*.....Painesville, O.
Panama R. R. 5 g. 48 m. 14 lo. 2,200 cars.
J. J. Iribe, *Supt*.......... Aspinwall, U. S. Col.
E. Z. Penfield, *Pur. Agt*.......New York, N. Y.
D. P. Wright, *M. M*.......Aspinwall, U. S. Col.
Passumpsic R. R. 4-8½ g. 147 m. 28 lo. 1,101 cars.
E. Raymond, *Pres. & Pur. Agt*..Boston, Mass.
H. E. Folsom, *Supt*...........Lyndonville, Vt.
L. L. Brigham, *M. M*........ . Lyndonville, Vt.
L. F. Woodard, *M. C. B* ....Lyndonville, Vt.
Paulding & Cecil Railway. 4-8½ g. 7 m. 3 lo. 28 c.
S. Frank Eagle, *Pres*...... ....Cecil, O.
Paw Paw and Toledo & South Haven R. Rds.
3 g. 20 m. 3 lo. 16 cars.
John Ihling, *Supt*................Lawton, Mich.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
G. R. Dickey, *Supt. & Pur. Agt*......York, Pa.
E. H. Williams, *M. C. B*...............York, Pa.
W. P. Kirk, *M. M*...................Oxford, Pa.
Pemigewasset Valley R. R. 4-8½ g. 21 m. 2 lo. 127c.
J. Thomas Vose, *Pres*........ ...Boston, Mass.
Pennsylvania Co.'s (5) Roads.
4-9 g. 3,222 m. 920 lo. 32,809 cars.
Gen. Divs. (1), (2), (3), (4) and (5).
Wm. A. Baldwin, *Gen. Man*.....Pittsburg, Pa.
John Thomas, *Gen. Supt*..... Pittsburg, Pa.
Wm. Mullins, *Gen. Pur. Agt*.....Pittsburg, Pa.
Joseph Wood, *Supt. M. P*.... .Fort Wayne, Ind.
(1) Pittsburg, Ft. Wayne & Chicago Ry.
4-9 g. 468 m. 288 lo. 8,023 cars.
E'n Div.: A. B. Starr, *Supt*.......Allegheny, Pa.
Geo. J. Parkin, *M. M*..... ....Allegheny, Pa.
D. M. Peppard, *M. M*........ . Crestline, O.
W'n Div.: C. D. Law, *Supt*.....Ft. Wayne, Ind.
F. D. Casanave, *M. M*........Ft. Wayne, Ind.
A. H. Somers, *Gen. For. Shops*...Chicago, Ill.
(2) Ashtabula & Pittsburg, and
(3) Erie & Pittsburg R. Rds. 221 m. 29 lo. 1,362 c.
John M. Kimball, *Supt*..Lawrence Junc., Pa.
J. A. Wood, *Gen. For. Shops*........Erie, Pa.
(4) Cleveland & Pittsb'g R. R. 225 m. 97 lo. 3,534 c.
R. F. Smith, *Asst. Man*.........Cleveland, O.
Philip Bruner, *Supt*............Wellsville, O.
W. F. Beardsley, *Mast. of Mach*. Wellsville, O.
(5) No-W'n Ohio Ry.: J. S. Morris, *Supt*...Toledo, O.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 3,158 m. 1,459 loco. 66,816 cars.
Chas. E. Pugh, *Gen Man*......Philadelphia, Pa.
Enoch Lewis, *Pur. Agt*.......Philadelphia, Pa.
John Reilly, *Supt. Trans*......Philadelphia, Pa.
T. N. Ely, *Gen S. M. P*.............Altoona, Pa.
(1) Pennsylvania R. R. Divs.
4-9 g. 1,213 m. 705 lo. 46,819 cars.
S. M. Prevost, *Gen Supt*. ... .Altoona, Pa
Frank L. Sheppard, *Supt. M. P*..Altoona, Pa.
G. W. Strattan, *M. M*.. ....Altoona, Pa.
Jno. P. Levan, *Gen. Fore*... ....Altoona, Pa.
Phila. Div.: Tho. Gucker, *Supt*. Philadelphia, Pa.
H. D. Garrett, *M. M*....W. Philadelphia, Pa.
I. W. Van Houten, *Gen. For*....W. Phila., Pa.
Mid. Div.: O. E. McClellan, *Supt*. Harrisburg, Pa.
E. L. Caum, *M. M*............Harrisburg, Pa.
Samuel W. Myers, *Gen. For*. Harrisburg, Pa.
Altoona Div.: Jas. Reed, *Supt*.......Altoona, Pa.
Pitts. Div.: Robert Pitcairn, *Supt*....Pittsburg, Pa.
D. O. Shaver, *M. M*............Pittsburg, Pa.
J. G. Stewart, *Gen. For*........Pittsburg, Pa.
W. Pa. Div.: A. P. Kirtland, *Supt*. Blairsville, Pa.
Wm. B. Norris, *M. M*..........Blairsville, Pa.
M. H. Fails, *Gen. For*..........Blairsville, Pa
Fred. Div.: J. B. Hutchinson, *Supt*.....York, Pa
Tyrone Div.: S. S. Blair, *Supt*........Tyrone, Pa.
Lew. Div.: Wm. M. Phillips, *Supt*. Lewistown, Pa.
Bed. Div.: R. L. Holliday, *Supt*.....Bedford, Pa.
Monong. Div.: David M. Watt, *Supt*. Pittsburg, Pa.
Wm. Lininger, *M. M*......... ....Pittsburg, Pa
(2) United R. Rs. of N. J. Divs. 471 m. 330 lo. 4,041 c.
F. Wolcott Jackson, *Gen. St*..Jersey City, N. J.
H. S. Hayward, *Supt. M. P*...Jersey City, N. J.
David H. Baker, *Gen. For*...Jersey City, N. J.
N.Y. Div.: Robt. E. Pettit, *Supt*. Jersey City, N. J.
L. A. Bosdevex, *M. M*. ..Jersey City, N. J.
E. F. Bosdevex, *Gen. For*..Jersey City, N. J.
Belv. Div.: J. A. Anderson, *Supt*. Lambertv., N. J.
R. McDowell, *M. M*.......Lambertville, N. J.
Amboy Div.: I. S. Buckalew, *Supt*. Camden, N. J.
Thos. Kerr, *M. M*....... ....So. Amboy, N. J.
P. S. Bogart, *Gen. For*......So. Amboy, N. J.
(2½) Camden & At. Rd.: 75 m. 18 l. 261 c.
W. N. Bannard, *Supt*.................. .and
Rufus Hill, *M. M*.. ....Camden, N. J.
Samuel Wills, *M. C. B* ....Camden, N. J.
(3) West Jersey R. R. 4-9 g. 188 m. 27 lo. 294 cars.
Joseph Crawford, *Gen. Supt*.....Camden, N. J
W. McAlister, *M. M*.... ....Camden, N. J.
C. C. Williams, *Gen. For*........Camden, N. J.
(4) Phila., Wilm. & Balt. R.R. 409 m. 128 lo. 1,882 c.
H. F. Kenney, *Gen. Supt*. ....Philadelphia, Pa.
J. M. Wallis, *S. M. P*. ....Philadelphia. Pa.
H. D. Gordon, *M. M*.........Wilmington, Del.
W. H. Lungren, *M. C. B*.....Wilmington, Del.
Cen. Div.: L. K. Lodge, *Supt*.......... Media, Pa.
Del. Div.: I. N. Mills, *Supt*......Wilmington, Del.
Mid. Div.: H. H. Carter, *Supt*..Wilmington, Del.
(5) Phila. & Erie R. R. Divs.: 437 m. 110 lo. 3,089 c.
R. Neilson, *Gen. Supt*.... ..Williamsport, Pa.
A. O. Dayton, *Supt. Mo. Po*..Williamsport, Pa.
E'n. Div.: E. B. Westfall, *Supt*. Williamsport, Pa.
Sun.H. & W. Div.: A. Walter, *Supt*.; and
H. K. Stout, *M. M*.... ... .Sunbury, Pa.
Mid. Div.: Tho. A. Roberts, *Supt*.....Renovo, Pa.
Wm. L. Holman, *M. M*..........Renovo, Pa.
West'n Div.: J. W. Reynolds, *Supt*.....Erie, Pa.
W. T. Smith, *M. M*............... ...Erie, Pa.
(6) Northern Central Ry. 4-9 g. 346 m. 152 lo. 6,610 c.
Robert Neilson, *Gen. Supt*...Williamsport, Pa.
A. O. Dayton, *Supt. M. P*....Williamsport, Pa.
A. W. Sumner, *Pur. Agt*... ....Baltimore, Md.
J. M. Coale, *M. M*...............Baltimore, Md.
G. W. Demarest, *Gen. For*......Baltimore, Md.
Susq. Div.: E. B. Westfall, *Supt*. Williamsport, Pa.
Sham. Div.: A. Walter, *Supt*...... ..Sunbury, Pa.
Elm. & Can. Divs.: S. Meade, *Supt*..Elmira, N.Y.
Jas. Strode, *M. M*..... .. ..Elmira, N. Y.
J. C. Dyott, *Gen. For*...... ....Elmira, N. Y.
Baltimore Div.: H.W. Kapp, *Supt*. Baltimore, Md.
(7) Balt. & Pot. & Alex. & Fred. 125 m. 30 lo. 360 c.
H. F. Kenny, *Gen. Supt*.......Philadelphia, Pa.
A. W. Sumner, *Pur. Agt*.... ....Baltimore, Md.
J. M. Wallis, *Supt. Mo. Po*....Philadelphia, Pa.
H. D. Gordon, *M. M*......... ..Wilmington, Del.
J. Lescallett, *For. Mach. Shop*. Washington, D.C.
R. F. Downs, *For. Car Shop*. Washington, D.C.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 3,271 c.
J. B. Smith, *Gen. Supt*. ....Dunmore, Pa
And. Crane, *M. M*. ....Dunmore, Pa.
Geo. W. Simpson, *M. C. B*........Dunmore, Pa.
Pennsylvania, Slatington & New England R. R.
In progress. 4-8½ g. 18 m. 1 lo. 20 cars.
C. H. Stanton, *Supt*.......... New York, N. Y.
Pennsylvania & Erie R. R.—Early Branch.
C. R. Early, *Gen. Supt*...........Ridgeway, Pa.
Pensacola & Atlantic R. R. 5 g. 161 m. 9 lo. 67 cars.
W. D. Chipley, *Gen. Supt*.......Pensacola, Fla.
W. D. Robb, *M. M*............. Pensacola, Fla.
Pensacola & Perdido R. R. 5 g. 10 m. 5 lo. 92 cars.
B. F. Simmons, *Pr. & Supt*.... Pensacola, Fla.
H. W. Simmons, *Pur. Agt*......Pensacola, Fla.
J. C. Schutte, *M. M*.............Pensacola, Fla.
People's Ry. 4-8½ g. 15 m. 2 lo. 14 cars.
W. D. Pollard, *Supt*....... ......Pottsville, Pa.
Peoria, Decatur & Evansville Ry.
4-8½ g. 254 m. 30 lo. 1,660 cars.
G. L. Bradbury, *Gen. Man*.... .... Peoria, Ill.
P. Reilly, *M. M*...................Mattoon, Ill.
Peoria & Farmington R. R. (*See Cen. Ia.*)
Peoria & Pekin Union Ry. 4-8½ g. 20 m. 12 lo. 106 c.
Thos. B. Burnett, *Gen. Supt. & P. A.* Peoria, Ill.
R. F. Hurd, *M. M. & C. B*.. ....Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 39 miles.
D. B. Clack, *Supt*.....Perkiomen Junction, Pa.
H. Boyd, *Pur. Agt*..............Norristown, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 133 cars
R. M. Sully, *Gen. Supt*....... .Petersburg, Va.
Geo. F. Jones, *Pur. Agt*..... ...Petersburg, Va.
R. B. Andrews, *M. M*..... .....Petersburg, Va.
J. W. Fleming, *M. C. B*........Petersburg, Va.
Phila., Wilmington & Balt. R. R. (*See Penna. R. R.*)
Peterborough & Hillsborough. (*See Northern, N. H.*)
Philadelphia, Newtown & New York R. R.
4-8½ g. 23 m.
W. M. Geary, *Supt*............Philadelphia, Pa.
Phila. & Atlantic City Ry. 3-6 g. 55 m. 11 lo. 134 cars.
F. S. Urie, *Supt*..............Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*.......Philadelphia, Pa.
H. M. Messimer, *M. M*..... .....Camden, N. J.
E. Lippincott, *M. C. B*.... ......Camden, N. J.
Philadelphia & Erie R. R. (*See Penna. R. R.; (5) Div.*)
Philadelphia & Reading R. R. (and Branches.)
4-8½ g. 1,582 m. 907 lo. 56,775 cars.
John E. Wootten, *Gen. Man*..Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*......Philadelphia, Pa.
Geo. Eltz, *Supt. Trans*.. .... Reading, Pa.
L. B. Paxson, *Eng. of Mach*...... Reading, Pa.
No. Pa. & Bound Brook Div.:
I. A. Sweigard, *Supt*........Philadelphia, Pa.
Mahanoy & Shamokin and other Brs.:
J. H. Olhausen, *Supt*...........Pottsville, Pa.
D. C. Reinhart, *Asst. Supt*. ...Catawissa, Pa.
A. A. Hesser, *Asst. Supt* Mahanoy Plane, Pa.
Schuylkill & Susquehanna Br.:
H. H. Tracy, *Supt*..... . ....Pine Grove, Pa.
Reading & Columbia Br.:
A. M. Wilson, *Supt*......... ...Columbia, Pa.
(2) N. J. Central Div.:
W. W. Stearns, *Supt*.... .....Elizabeth, N. J.
W. Woodcock, *M. M*.. ......Elizabethport, N. J.
Geo. Hackett, *M. C. B*. ....Elizabethport, N. J.
C. G. Williams, *M. M*.........Jersey City, N. J.
John Alpaugh, *M. M*.........Phillipsburg, N. J.
L. Br. Div.: H. H. Nieman, *Supt*..Long Branch, N.J.
N. J. So. Div.: R. Blodgett, *Supt* ...Manchester, N.J.
Wm. Montgomery, *M. M*....Manchester, N. J.
Chas. N. Sawyer, *M. C. B*....Manchester, N. J.
Lehigh & Susquehanna Div.:
W. S. Polhemus, *Supt*. ... Mauch Chunk, Pa.
Pittsburg, Bradford & Buffalo Ry. (*See Pitts. & West.*)
Pittsburg, Chartiers & Youghiogheny R. R.
4-8¾ g. 19 m.
Geo. S. Griscom, *Gen. Man*......Pittsburg, Pa.
Pittsburgh, Cincinnati & St. Louis Ry. (5 Gen. Divs.)
4-9 g. 916 m. 239 lo. 7,133 cars.
James McCrea, *Manager*.........Columbus, O.
Wm. Mullins, *Pur. Agt* ... ...Pittsburg, Pa.
Edward B. Wall, *Supt M. P*.......Columbus, O.
(1) P., C. & St. L. Div.: E. B. Taylor, *Supt*. Pittsburg, Pa.
C. B. Street, *M. M*. ....Dennison, O.
J. M. Copeland, *G. F. Car Shops*. Steubenville, O.
(2) C. & M. V. Div.: W. F. Black, *Supt*..Zanesville, O.
Leroy Kells, *M. M*..... ....Lancaster, O.
Wm. Meikle, *Gen. For*......... Lancaster, O.
Daniel Jewell, *Gen. F. Car Shops*. Lancaster, O.
(3) Li. Mi. Div.: Ralph Peters, *Supt*....Cincinnati, O.
Leroy Kells, *M. M*..............Cincinnati, O.
Jos. Underwood, *G. F. Car Shops*. Cincinnati, O.
(4) J.M. & I.R.R.: E.W. McKenna, *Supt*. Louisville, Ky.
Wm. Swanston, *M. M*. ...Jeffersonville, Ind.
Edw. Austin, *G. F. C. Shops*. Jeffersonville, Ind.
(5) Indianapolis & Vincennes R. R.
J. J. Turner, *Supt*........Indianapolis, Ind.
Pittsburgh, Cleveland & Toledo R. R.
4-8¾ g. 78 m. 18 lo. 525 cars.
C. H. Andrews, *Pres*............Youngstown, O.
W. C. Agnew, *Supt*.............Youngstown, O.
W. F. Hofecker, *M. M*... ...Youngstown, O.
Pittsburg, Ft. Wayne & Chicago Ry. (*See Penna. Co.*)
Pittsburg Southern Ry. (*See Balt. & O.*)
Pitts. & Castle Shannon R. R. 3-4 g. 9 m. 5 lo. 428 c.
James M. Bailey, *Gen. Supt*.... Pittsburg, Pa.
Holmes Ward, *M. M*.......Castle Shannon, Pa.
Wm. E. Long, *M. C. B* .... Pittsburg, Pa.
Pitts. & Lake Erie R. R. 4-8¾ g. 70 m. 31 lo. 1,820 c.
W. C. Quincy, *Gen. Man*.........Pittsburg, Pa.
R. W. Jones, *Mast. Trans*.......Pittsburg, Pa.
S. W. Haines, *M. M*....... .....Pittsburg, Pa.
Pittsburgh, McKeesport & Youghiogheny.
4-8¾ g. 57 m. 19 lo. 267 cars.
W. C. Quincy, *Gen. Man*...... Pittsburgh, Pa.
R. W. Jones, *M. of Trans*......Pittsburgh, Pa.
S. W. Haines, *M. M*.......... Pittsburgh, Pa.
Pitts. & Western R. R. 3 & 4-8½ g. 110 m. 18 lo. 365 c.
Pitts., Bradford & Buff. Ry. 3 g. 93 m. 8 lo. 163 c.
Tho. M. King, *Gen. Man*.........Allegheny, Pa.
J. T. Johnson, *Supt*.... ....Allegheny, Pa.
N. Bruce, *Pur. Agt*. ....Allegheny, Pa.
W. M. Flahavhan, *M. M*.........Allegheny, Pa
Pontiac, Oxford & Pt. Austin R. R. 100 m.
Geo. W. Debevoise, *Pr. & Gen. Man*. Oxford, Mich.
Jas. Houston, *Gen. Supt*....... ..Oxford, Mich.
Port Huron & No.-Western Ry. 3 g. 218 m. 14 lo. 288 c.
H. McMorran, *G. Man. & P. A*. Port Huron, Mich.
J. R. Wadsworth, *Supt*.. ...Port Huron, Mich.
Chas. Deifenbach, *M. M*.....Port Huron, Mich.
Benj. Hillier, *M. C. B*........Port Huron, Mich.
Port Jervis & Monticello R. R. 4-8½ g. 24 m. 3 lo. 13 c.
M. V. Heller, *Gen. Man*......Port Jervis, N. Y.
Port Royal & Augusta Ry. 5 g. 180 m. 16 lo. 310c.
J. N. Bass, *Supt*..................Augusta, Ga.
T. F. Warwick, *M. M. & M. C. B*. Augusta, Ga.
Portland & Ogdensburg. 4-8½ g. 110 m. 11 lo. 311 c.
J. Hamilton, *Gen. Supt. & P. A*..Portland, Me.
M. M...... ....Portland, Me.
W. G. Brewer, *M. C. B*.... ....Portland, Me.
Portland & Rochester R. R. 4-8½ g. 52 m. 7 lo. 230 c.
J. W. Peters, *Supt. & Pur Agt*..Portland, Me.
E. H. C. Tompson, *For. of Mach*..Portland, Me.
David Dow, *For. of Car Repairs*. Portland, Me
Potomac, Fred.'g & Pied. R. R 3 g. 38 m 2 lo. 38 c.
Will M. Grafton, *Supt*..... ..Fredericksburg, Va.
W. J. Sweigard, *M. M*.....Fredericksburg, Va.
Pough., Hart. & Bos. R. R. 4-8½ g. 45 m. 4 lo. 65 c.
J. A. Perkins, *Supt*........Poughkeepsie, N. Y.
John L. Donaldson, *M. M*. Poughkeepsie, N. Y.
Pratt Coal & Coke Company's R. R. 5 g. 9 m. 5 lo. 100 c.
W. L. Gude, *Gen. Man*.... .. Pratt Mines, Ala.
Prescott & Thirty-Fifth Parallel R. R.
4-8½ g. 77 miles in progress.
Samuel A. Henszey, *Gen. Man*. Prescott, Ariz.
Prince Edward Island Ry. 3-6 g. 199 m. 18 lo. 280 c.
Jas. Coleman, *Supt. & Pur. Agt.;*
Jos. Unsworth, *M. Supt. & Storekeeper;* and
D. M. Fraser, *M. C. B*.. .Charlottetown, P. E. I.
Profile & Franconia Notch R. R. 3 g. 15 m. 3 lo. 18 c.
Emmons Raymond, *Pur. Agt*.. Boston, Mass.
C. H. Greenleaf, *Supt*.....Profile House, N. H.
Prospect Park & Coney Island R. R.
4-8½ g. 15 m. 8 lo. 123 cars.
R. Schermerhorn, *Supt*........Brooklyn, N. Y.
Martin Painter, *M. M*...........Brooklyn, N. Y.
Prov., Warren & Bristol R. R. 4-8½ g. 19 m. 6 lo. 79 c.
Waterman Stone, *Supt*.. .. ..Providence, R. I.
Rufus Smith, *M. M. & C. B*........Bristol, R. I.
Prov. & Springfield R. R. 4-8½ g. 23 m. 4 lo. 92 c.
Wm. Tinkham, *Gen. Man*.....Providence, R. I
G. T. Richardson, *M. M*........Providence, R. I.
Prov. & Worcester. 4-8½ g. 66 m. 34 lo. 1,155 c.
W. E. Chamberlain, *Supt* .....Providence, R. I.
A. Griggs, *Supt. L. & C. D*....Providence, R. I.
Pullman's Palace Car Co. 564 passenger cars.
A. B. Pullman, *2d V.-Pr. & G. M*.. Chicago, Ill.
Geo. F. Brown, *Gen. Supt*...... ...Chicago, Ill.
Wm. A. Angell, *Pur. Agt*.... ......Chicago, Ill.
S. W. Bretzfield, *Asst. Pur. Agt*. New York, N.Y.
A. Rapp, *Man*. (Chicago Works)...Chicago, Ill.
H. L. Spaulding, *Man*. (Det Shops). Detroit, Mich.
E. A. Benson, *Supt. Shops*...... St. Louis, Mo.

Q

Quebec Central Ry. 4-8½ g. 147 m. 10 lo. 267 cars.
J. R. Woodward, *Gen. Man*. Sherbrooke, P. Q.
A. Steele, *Supt*.. .... Sherbrooke, Que.
R. D. Morkill, Jr., *Pur. Agt*..Sherbrooke, P. Q.
Jas. Selveright, *M. M* ..... Sherbrooke, P. Q.
Quebec, Montreal, Ottawa & Occidental Ry.
4-8½ g. 354 m. 36 lo. 993 cars.
L. A. Sereeal, *Gen. Supt*........Quebec, Que.
Quebec & Lake St. John Ry. 4-8½ g. 36 m. 3 lo. 55 c.
J. G. Scott, *Manager*..............Quebec, Can.
Frank Fournier, *Supt*... ...St. Raymond, P. Q.
John T. Eames, *M. M*.. ....St. Raymond, P. Q.
Queen Anne's & Kent and Townsend Branch R. R.
(*See Penna.; (4) Div.*)

R

Raleigh & Augusta Air-Line; Carolina Central.
Raleigh & Gaston R. Rs. 4-8½ g. 436 m. 50 lo. 994 c.
John C. Winder, *Gen. Man. & P. A*. Raleigh, N. C.
Raleigh Rds. 4-8½ g. 194 m. 22 lo. 563 cars.
B. R. Harding, *Supt. of Mach*. Raleigh, N. C.
Carolina Cen. R.R. 4-8½ g. 242 m. 26 lo. 431 c.
L. C. Jones, *Supt*.... .....Wilmington, N. C.
James Maglenn, *M. of Mach*. Laurinburg, N. C.
S. R. Ethridge, *M. C. B* ...Laurinburg, N. C.
Rensselaer & Saratoga R.R. (*See Del. & Hud. Can. Co.*)
Rhinebeck & Connecticut. (*See Hart. & Ct. Wn.*)
Richmond, Fredericksburg & Potomac R. R.
4-8½ g. 83 m. 15 lo. 146 cars.
E. T. D. Myers, *Gen. Supt* .. Richmond, Va.
T. L. Courtney, *Asst. Supt* ..Richmond, Va.
H. Kuhn, *M. M*.......... ...Richmond, Va.
W. H. Trainham, *M. C. B*. ...Richmond, Va.
Richmond & Alleghany R.R. 4-9 g. 261 m. 19 lo. 837c.
Decatur Axtell, *Rec. & Gen. Man*. Richmond, Va.
M. Sweeney, *Pur. Agt*.. .... ..Richmond, Va
Geo. D. Harris, *M. M. & C. B*....Richmond, Va
Richmond & Danville R. R. Co.'s Roads.
1,736 miles 218 loco. 3,833 cars.
A. L. Rives, *Gen. Man* ....Richmond, Va.
Peyton Randolph, *As. G. Man*..Richmond, Va.
J. P. Minetree, *Pur. Agt*....... Richmond, Va.
R. D. Wade, *Supt. Mo. Po*... ...Richmond, Va.
(1) Rich. & Dan. R. R. 5 g. 847 m. 131 lo. 2,687 cars.
Rich. & Dan. Div.: 5 g. 420 m. 80 lo. 1,797 c
Wm. H. Green, *Supt*...... ....Richmond, Va.
T. W. Gentry, *M. M*.... .....Richmond, Va.
J. B. Vaughan, *For. Car Sh*...Richmond, Va.
North Carolina Div. 5 g. 223 m. 22 lo. 268 cars.
A. B. Andrews, *Supt*.... ......Raleigh, N. C.
W. H. Turrentine, *M. M*. Comp'y's Shops, N.C.
J. C. Holt, *For. Car Sh*. Comp'y's Shop, N. C.
Atlanta & Char. Air Line. 5 g. 280 m. 31 lo. 415 c.
Narrow-Gauge Branches. 3 g. 80 m. 5 lo. 41 c.
Edmund Berkley, *Supt*..... ....Atlanta, Ga.
W. A. Walden, *M. M*. . .. .Atlanta, Ga.
Z. T. Smith, *For. Car Sh*.... .... Atlanta, Ga.
(2) Charlotte, Col. & Aug. R. R. 5 g. 239 m. 22 lo. 287 c.
G. R. Talcott, *Supt*..........Columbia, S. C.
J. H. Green, *M. M*. (2 roads)...Columbia, S. C.
(3) Columbia & Greenville R. R. 5 g. 297 m. 22 l. 224 c.
G. S. Talcott, *Supt*...........Columbia, S. C.
J. O. Meredith, *For. E. & C. Rep*.. do.
(4) Virginia Midland Ry. 4-8½ g. 353 m. 41 lo. 631 c.
W. M. S. Dunn, *Eng. & Supt*. Alexandria, Va.
J. E. Waddey, *M. of M*......Alexandria, Va.
J. T. Nalls, *M. C. B*. ....Alexandria, Va.
Richmond & Petersburg R.R. 4-8½ g. 25 m. 8 lo. 132 c.
J. R. Kenly, *Supt*..... ....Richmond, Va.
John O'Brien, *M. M*.............Richmond, Va.
Rio Grande R. R. 3-6 g. 22 m. 3 lo. 40 cars.
M. J. Gomila, *Rec. & Gen. Man*. Brownsville, Tex.
G. W. Rendall, *M. M*......... Brownsville, Tex.
M. Markwood, *M. C. B*... ....Brownsville, Tex.
Rio Grande & Pecos Ry. 4-8½ g. 27 m. In progress.
W. W. Hungerford, *Man*.........Laredo, Tex.
Rochester & Lake Ontario Ry. 4-8½ g. 6 m. 2 lo. 10 c.
N. B. Ellison, *Man* ... .Rochester, N. Y.
Rochester & Pittsb'g. R.R. 4-8½ g. 260 m. 60 lo. 3,146 c.
Geo. E. Merchant, *Gen. Man*...Rochester N. Y.
J. T. Gardiner, *Gen. Supt*....Rochester, N. Y.
J. P. Hovey, *M. M*........ ....Rochester, N. Y.
J. R. Sherburne, *For. Sh*..... ..Buffalo, N. Y.
Rock Island & Mercer County R. R., and
Rock I'd & Peoria Ry. 4-8½ g. 113 m. 13 lo. 357 c.
R. R. Cable, *V.-P. & Gen. Supt*..Rock Island, Ill.
R. I. & P. Ry.: H. B. Sudlow, *Supt. & P. A*. do.
Joseph Elder, *M. M*................Peoria, Ill.
R. I. & M. C. Rd.: B. T. Cable, *Supt*. R'k Island, Ill.
J. H. Parks, *M. M*............ .Rock Island, Ill.
Rogersville & Jefferson R. R. 5 g. 16 m. 1 lo. 6 cars.
C. M. Leuty, *Supt*........ Rogersville, Tenn.
Rome (Ga.) R. R. 5 g. 20 m. 2 lo. 17 cars.
Eben Hillyer, *Supt*................. Rome, Ga.
O. W. Harbin, *M. M. & C. B*......... Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4-8½ g. 417 m. 61 lo. 1,831 cars.
H. M. Britton, *Gen. Man. & P. A*. Oswego, N. Y.
Geo. H. Haselton, *S. M. P. & M*..Oswego, N. Y.
E'n Div.: J. D. Remington, *A. Supt*. Watertown, N.Y.
W'n Div.: W. H. Chauncey, *A. Supt*. Oswego, N. Y.
Roodhouse & Scottsville Ry. In progress.
Geo. P. Merrill, *Gen. Man*..........Chicago, Ill.
Ruby Hill R. R. (*See Eureka & Pal.*)
Rumford Falls & Buckfield R.R. 4-8½ g. 29 m. 2 l. 62 c.
L. L. Lincoln, *Supt. & Pur. Agt*...Canton, Me.

S

Sabine & East Texas Ry. (*See Cen. Pac.*)
Sacramento & Placerville R. R. (*See Cen. Pac.*)
Saginaw Bay & Northw'n R.R. 4-8½ g. 31 m. 6 lo. 136 c.
J. Jackson, *Gen. Man*.... ...Pinconning, Mich.
F. T. Lillote, *Act. Pur. Agt*...Pinconning, Mich
Edward Keeler, *M. M*........Pinconning, Mich
Saginaw, Tuscola & Huron R. R.
3 g. 50 m. 3 lo. 83 cars.
C. S. McMillan, *Gen. Supt*..E. Saginaw, Mich.
Saginaw Valley & St. Louis R. R. 4-8½ g. 39 m. 4 l. 64 c
N. W. Merrill, *Supt* ....Saginaw, Mich.
Allan Bourn, *Pur. Agt*.. ... .Detroit, Mich.
Geo. C. Watrous, *M. M*.... ....Iona, Mich.
Salisbury R. R. 4-8½ g. 11 m. 1 lo. 1 car.
R. J. Batzer, *Supt*.............Pittsburgh, Pa.
Salt Lake & Western R. R. (*See Un. Pac.; (6) Div.*)
San Francisco & No. Pac. 4-8½ g. 139 m. 11 lo. 245 c.
Arthur Hughes, *Gen. Man*..San Francisco, Cal.
H. C. Whiting, *Supt*.... ....Petaluma, Cal.
Ed. Reynolds, *Gen. M. M*.........Donahue, Cal.
Ed. Reynolds, *M. C. B*.......... Donahue, Cal.
Sanborn, Cooperstown & Turtle M. R. R. In progress.
C. A. Roberts, *Gen. Man*. ..... Sanborn, Dak.
Sandy River R. R. 2 g. 18 m. 3 lo. 34 cars.
N. B. Beal, *Pres. & Supt* ....Phillips, Me.
M. Saunders, *M. M. & C. B*........Phillips, Me.
Sandusky, Mansfield & Newark R. R. (*See B. & O.*)
Sanford & Indian River R. R. (*See So. Flor.*)
San Luis Obispo & Santa Maria R. R.
3 g. 20 m. 2 lo. 30 cars.
Charles Goodall, *Man*......San Francisco, Cal.
San Pete Valley R. R. 3 g. 33 m. 2 lo. 57 cars.
F. C. Hand, *Supt*.................Wales, U. T.
J. E. Bamberger, *Pur. Agt*.... Salt Lake, U. T.
B. Bates, *M. M*................. Wales, U. T.
Santa Cruz R. R. (*See So. Pac.; Nor'n Div.*)
Saratoga, Mt. McGregor & Lake George R. R.
3 g. 11 m. 3 lo. 12 cars.
John McGee, *Supt*. ....Saratoga Springs, N. Y.
Savannah, Florida & W'n Ry. 5 g. 425 m. 50 lo. 736 c.
H. S. Haines, *Gen. Man*........Savannah, Ga.
R. G. Fleming, *Supt*... ....Savannah, Ga.
F. S. Pendergast, *Ch. Eng*........Savannah, Ga.
A. A. Aveilhé, *Pur. Agt*..........Savannah, Ga.
G. M. D. Riley, *M. of Mach*......Savannah, Ga.
E. Giffken, *For. Car Dept*. .....Savannah, Ga.
Sav., Griffin & No. Ala. R. R. *Op. by Central (Ga.)*.
Schuylkill & Lehigh R. R. (*See Phil. & Read.*)
Schoharie Valley R. R. (*See Middleburg & Sch.*)
Scioto Valley R. R. 4-8¾ g. 132 m. 17 lo. 548 cars.
Geo. Skinner, *Supt. & P. A t*.....Columbus, O.
R. Bromley, *M. M*. ....Portsmouth, O.
Seaboard & Roanoke R. R. 4-8½ g. 80 m. 21 lo. 384 c.
E. G. Ghio, *Mast. of Trans*....Portsmouth, Va.
J. A. Walton, *Pur. Agt*........Portsmouth, Va.
M. M. Pendleton, *S. M. P. & M*. Portsmouth, Va.
Sedalia, Warsaw & Southern Ry. (*See Mo. Pac.*)
Sharpsville R. R. 4-8½ g. 23 m. 3 lo. 13 cars.
Walter Pierce, *Gen. Man*.......Sharpsville, Pa.
Shenandoah Valley R. R. 4-9 g. 249 m. 32 lo. 849 c.
Norfolk & Western R. R. 5 g. 486 m. 82 lo. 1,779 c.
J. H. Sands, *Gen. Supt* ....Roanoke, Va.
W. C. De Armond, *Pur. Agt*. ..Philadelphia, Pa.
Chas. Blackwell, *Supt. of M. P*...Roanoke, Va.
Sh. Val. Rd.: D. W. Flickwir, *Supt*., Roanoke, Va.
N. & W.; W. Div.: Frank Huger, *Supt*.; and
N. & W.; E. Div.: N. M. Osborne, *Supt*.; and
J. T. Robinett, *M. M*. . ..... Petersburg, Va.
Shenango & Allegheny R.R. 4-9½ g. 57 m. 8 lo. 248 c.
J. T. Blair, *G. Man. & Pur. Agt*. Greenville, Pa.
Edw. Richardson, *M. M. & C. B*. Greenville, Pa.
Shepaug R. R. 4-8½ g. 38 m. 3 lo. 28 cars
Edwin McNeill, *Supt*.............Litchfield, Ct.
F. J. Broughet, *M. M*.......... Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt*....Ripley, Miss
W. H. Phelps, *M. M*................Ripley, Miss.
Silver City, Deming & Pacific R. R. 3 g. 47 m. 3 l. 141 c.
John W. Smith, *Gen. Supt*....Silver City, N. M.
Silver Lake Ry. 4-8½ g. 6 m. 1 lo. 4 cars.
S. L. Chapin, *Supt*.............. ..Perry, N. Y
Sinaloa & Durango R. R. 4-8½ g. 38 m. 2 lo. 40 cars.
Geo. S. Skilton, *Supt*......Altata, Sinaloa, Mex.
John E. Bell, *M. M*...............Culiacan, Mex.
Skaneateles R. R. 4-8½ g. 5 m. 2 lo. 5 cars.
J. McNamara, *Supt* ....Skaneateles, N. Y.
Sioux City & Pacific R. R. 4-8½ g. 427 m. 28 lo. 785 c.
P. E. Hall, *Gen. Man. & P. A*. Cedar Rapids, Ia.
C. M. Lawler, *Gen. Supt*....Missouri Valley, Ia.
W. G. Brownson, *Asst. Supt*.... .Norfolk, Neb.
S. A. Teal, *M. M*....... ....Missouri Valley, Ia.
W. H. Ramseyer, *M. C. B*. ..Missouri Valley, Ia.
Smyrna & Delaware Bay R. R. (*See Kent County.*)
Sodus Bay & Southern Ry. 4-8½ g. 34 m. 4 lo. 40 c.
G. H. Stearns, *Gen. Man*. ..Sodus Point, N. Y.
G. H. Stearns, *Supt. & Pur. Agt*. Sodus Point, N.Y.
F. H. Garlock, *M. M*........Sodus Point, N. Y.
C. H. Hill, *M. C. B* ....Sodus Point, N. Y.
Somerset R. R. 4-8½ g. 25 m. 3 lo. 24 cars.
W. M. Ayer, *Supt & Pur. Agt*......Oakland, Me.
S. P. Mosher, *For. Car Rep*....No. Anson, Me.
C. Crowell, *For. Lo. Rep's*.....No. Anson, Me.
Somerset & Cambria R. R. (*See B. & O.*)
Sonora Ry. (*See A., T. & S. Fe.*)
South & North Alabama R. R. (*See Louis. & Nash.*)
South Carolina Ry. 5 g. 246 m. 46 lo. 834 cars
John B. Peck, *Gen. Man*. ......Charleston, S. C.
S. B. Pickens, *Pur. Agt*........Charleston, S. C.
P. J. Cochrane, *Mast. of Mach*. Charleston, S. C.
Geo. H. Gramling, *M. C. B*....Charleston, S. C.
South-Eastern Ry. 4-8½ g. 280 m. 30 lo. 1,000 cars.
T. A. McKinnon, *Gen. Man*.....Montreal, Can.
A. G. Eastman, *M. M*..........Farnham, P. Q.
South Florida R. R. 3 gauge 115 m. 13 lo. 250 cars.
B. R. Swoope, *Supt. & P. A*.......Sanford, Fla.
R. Derby, *M. M*............ ......Sanford, Fla.
A. D. Stentiford, *M. C. B*..........Sanford, Fla.
South Mountain R. R. 4-8½ g. 18 m. 4 lo. 22 c.
W. H. Woodward, *Supt*. Pine G've Furnace, Pa.
South Pacific Coast R. R. 3 g. 81 m. 16 lo. 500 cars
M. Fillmore, *Supt*... . ....San Francisco, Cal.
G. H. Waggoner, *Pur. Agt*..San Francisco, Cal.
D. E. Arnold, *M. M. & C. B* ....Newark, Cal.
South-Western R. R. (Ga.) (*See Central of Ga.*)
South-Western Ry. (Ky.) 4-8½ g. 4 m. 1 lo. 38 cars.
J. M. Wilson, *Supt*............Harrodsburg, Ky.
J. Tomlinson, *Pur. Agt*......Harrodsburg, Ky.
Southern Central R. R. 4-8½ g. 156 m. 21 lo. 467 c.
James G. Knapp, *Gen. Supt. & P. A*. Auburn, N.Y
John White, *M. M*... ....Auburn, N. Y.
H. Mooney, *M. C. B*.............Auburn, N. Y.
Southern Kansas Ry. (*See At., Top. & Santa Fe.*)
Southern Maryland R. R. 4-8½ g. 20 m. 1 lo. 20 c.
Robert Knight, *Supt*. ....Brandywine, Md.
C. R. Joyce, *M. M*......... .. Brandywine, Md.
Southern Pacific R. R. 4-8½ g. 198 m. 30 lo. 728 c.
Northern Div. (*For other Divs. see Cen. Pac.*)
A. C. Bassett, *Supt*. ......San Francisco, Cal.
J. R. Watson, *Pur. Agt*.....Sacramento, Cal.
J. T. Wilson, *M. M*..... ..San Francisco, Cal.
F. N. Bellisle, *M. C. B*. ...San Francisco, Cal.
Southern Pacific R. R. of Arizona. (*See Cen. Pac.*)
Southern Pacific R. R. of New Mexico. (*See Cen. Pac.*)
Spartanburg, Union & Columbia R. R.
(*See Rich. & Dan.; (3) Div.*)
Spring Brook R. R. 4-3 g. 8 m. 1 lo. 18 cars.
Charles Pugh, *Pres*......... ... ..Pittston, Pa.
Spring Hill & Parrsboro Ry. (*See Cumberland.*)
Springfield, Effingham & So.-E'n Ry. (*See Ind. & Ill.*)
Springville & Sardinia Ry. 4-8½ g. 12 m. 1 lo. 8 c.
Bertrand Chaffee, *Pres*.... ..Springville, N. Y.
St. Croix & Penobscot R. R. 4-8½ g. 22 m. 4 lo. 195 c.
S. W. Haycock, *Supt. & Pur. Agt*. .Calais, Me.
G. H. Corsen, *M. M*....... .... ..Milltown, Me.
H. C. Tincker, *M. C. B*............Milltown, Me.
St. John & Maine Ry. (*See New Brunswick.*)
St. John's Ry. 4-8½ g. 14½ m. 2 lo. 24 cars.
R. McLaughlin, *Pr. & Supt*. .Jacksonville, Fla.
Geo. Ferro, *M. of Mach*.. ....Tocoi, Fla.
St. John's & Lake Eustis Ry. 3 g. 36 m.
W. J. Jarvis, *Supt*............ Ft. Mason, Fla.
St. Johnsb'ry & Lake Champ 4-8½ g. 120 m 10 lo. 372 c.
A. B. Jewett, *Supt. & P. A*..St. Johnsbury, Vt.
Geo. E. Howe, *M. M. & C. B*. St. Johnsbury, Vt.
St. Joseph Valley R. R. 3 g. 15 m. 1 lo. 11 cars.
E. T. Chase, *Gen. Man*. .Berrien Springs, Mich.
St. Joseph & Des Loge Ry. 3 g. 13 m. 4 lo. 70 cars.
T. T. Onderdonk, *Supt*..... Bonne Terre, Mo.
St. Joseph & Western R. R. (*See Union Pac.; (1) Div.*)
St. Joseph & Des Moines R. R. (*See K. C., St. J. & C. B.*)
St. Lawrence & Ottawa Ry. (*See Can. Pac.*)
St. Louis, Alton & Terre Haute R. R.
Main Line. (*See C., C., C. & I.; Ind. & St. L. Div.*)
St. Louis & Cairo Div.: 4-8½ g 137 m. 17 lo. 800 c.
G. W. Parker, *Gen. Man*.......St. Louis, Mo.
J. L. Hinckley, *Supt*... ... .Belleville, Ill.
A. M. De Clerq, *M. M*.......... St. Louis, Mo.
St. Louis Bridge Co. and Tunnel R. R.
4-8½ g. 31 m. 22 lo. 11 cars.
Wm. Taussig, *Gen. Man*..........St. Louis, Mo.
A. W. Dickinson, *Supt*.... ....St. Louis, Mo.
J. E. Williams, Jr., *Pur. Agt*....St. Louis, Mo
H. M. Smith, *M. M*................St. Louis, Mo.
St. Louis Coal R. R. 4-8½ g. 93 m. 10 lo. 217 cars.
Jas. Prentice, *Supt*...............Carbondale, Ill.
Jas. C. Bryden, *Pur. Agt*... ....St. Louis, Mo.
St. Louis, Des Moines & Northern Ry. 4-8½ g. 43 m.
C. F. Merk, *Supt*................Des Moines, Ia.
St. L., Ft. Scott & Wichita R.R. 4-8½ g. 160 m. 6 l. 337 c.
J. W. Miller, *V. P. & Gen. Man*..Fort Scott, Kan.
Tho. N. Lewis, *Asst. Supt*......Fort Scott, Kan.
Tho. N. Lewis, *Pur. Agt*.... ..Fort Scott, Kan.
Henry Berger, *M. M* ....Ft. Scott, Kan.
A. A. Liddell, *M. C. B*......... ..Ft. Scott, Kan.
St. L., Hannibal & Keokuk. 4-8½ g. 85 m. 5 lo. 70 c.
W. W. Walker, *Gen. Supt*....... Hannibal, Mo.
Geo. Douglass, *Pur. Agt*.........Hannibal, Mo.
St. Louis, Iron Mt. & So'n Ry. (*See Mo. Pac.; (4) Div.*)
St. L., Keokuk & No.-W'n. Ry. (*See C., B. & Q.*)
St. L., Salem & Little Rock. 4-9 g. 72 m. 5 lo. 111 c.
H. A. Crawford, *V. Pr. & P. A*...St. Louis, Mo.
E. B. Sankey, *Supt*..................Salem, Mo.
Thomas Everson, *M. M*. ....Steelville, Mo
J. W. Houston, *M. C. B*...........Steelville, Mo.
St. Louis & Cairo R. R. 3 g. 152 m. 22 lo. 896 cars.
Chas. Hamilton, *Gen. Supt*..... .St. Louis, Mo.
R. M. Pringle, *M. M*..............St. Louis, Mo.
St. L. & San Fran. Ry. 4-8½ g. 902 m. 88 lo. 3,000 c.
C. W. Rogers, *V. P. & Gen. Man*..St. Louis, Mo.
D. H. Nichols, *Mast. Tran*..No. Springfield, Mo.
A. G. Thompson, *Pur. Agt*.......St. Louis, Mo.
M. Kearney, *M. M. & C. B*..No. Springfield, Mo.
East Div.: A. Veech, *Supt*...... ..St. Louis, Mo.
Central Div.: W. A. Thoms, *Supt*..Springfield, Mo.
Kan. Div.: J. R. Wentworth, *Supt*. Neodesha, Kan.
St. Martin's & Upham Ry. 4-8½ g. 30 m. 2 lo. 8 cars.
A. E. Killam, *Manager*........St. Martin's, N. B.
St. Paul, Minneapolis & Manitoba Ry.
4-8½ g. 1,402 m. 201 lo. 5,068 cars.
A. Manvel, *Gen. Man*............St. Paul, Minn.
E. B. Wakeman, *Asst. Gen. Supt*. St. Paul, Minn.
J. C. Morrison, *Pur. Agt*........St. Paul, Minn.
H. Middleton, *M. M. & C. B* ... St. Paul, Minn.
Breck. Div.: W. S. Kemp, *Supt*...St. Paul, Minn.
F. F. Div.: J. B. Rice, *Supt*........St. Paul, Minn.
No'n Div.: A. Guthrie, *Supt*.....Crookston, Minn.
St. Paul & Duluth R.R. 4-8½ g. 225 m 37 lo. 1,080 c.
H. P. Breed, *Gen. Supt*..... ....St. Paul, Minn.
J. G. Callahan, *Pur. Agt*........St. Paul, Minn.
W. McFarland, *M. M*............St. Paul, Minn.
John Hill, *M. C. B*. ....St. Paul, Minn.
State Line & Sullivan R. R. 4-8½ g. 25 m. 3 lo. 263 c.
I. O. Blight, *Supt*................Towanda, Pa.
Staten Island R. R. 4-8½ g. 13 m. 4 lo. 18 c.
J. W. Wilbur, *Supt*............New York, N. Y.
Stony Clove & Catskill Mountain R. R.
3 g. 14 m. 2 lo. 22 cars.
Geo. Coykendall, *Gen. Supt*....Rondout, N. Y.
Stony Creek R. R. 4-8½ g. 11 m.
Geo. B. Boggs, *Supt* .... Norristown, Pa.
Sterling Mountain Ry. 6 g. 8 m. 2 lo. 145 cars.
J. C. Missimer, *Supt*..........Sloatsburg, N. Y.
Suffolk Lumber R. R. 3 g. 15 m. 3 lo. 41 cars.
W. M. Whaley, *Supt*.. ....Suffolk, Va.
Summit Branch R. R. 4-9 g. 20 m. 7 lo. 10 cars.
Thomas Gucker, *Supt*........Williamsport, Pa.

Susquehanna & Delaware River R. R. In progress.
D. Y. Kilgore, *Pres*. ....Philadelphia, Pa.
Sussex R. R. *(See Del., Lack. & West.)*
Syracuse, Binghamton & N. Y. R. R. *(See D. L. & W.)*
Syr., Ontario & N. Y. R. R. *(See N. Y., W. Sh. & Buf.)*
Syracuse, Geneva & Corning; Corning, Cowanasque & Antrim R. Rs. 4-8½ g. 142 m. 28 lo. 1,044 c.
A. H. Gorton, *Supt* ....Corning, N. Y.
W. E. Gorton, *Asst. Supt*.........Corning, N. Y.
Andrew Beers, *Pur. Agt*.........Corning, N. Y.
O. C. Patchell, *M. M*.............Corning, N. Y.
C. J. Butler, *M. C. B*.............Corning, N. Y.

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Tawas & Bay County R. R. 3-2 g. 28 m. 2 lo. 100 c.
Henry Clark, *Gen. Supt*......Tawas City, Mich.
Tennessee Coal R. R. 5 g. 28 m. 8 lo. 204 cars.
A. M. Shook, *Gen. Man*......Tracy City, Tenn.
W. A Knight, *M. M*......... Tracy City, Tenn.
Tennessee & Sequatchee Valley R. R. 3 g. 42 m. 1 lo. 24 cars.
Chas. Clinton, *Gen. Supt*....Spring City, Tenn.
P. V. Mooney, *Pur. Agt*......Spring City, Tenn.
Terre Haute & Indianapolis R. R. 4-9 g. 398 m. 105 lo. 4,170 cars.
Joseph Hill, *Gen. Supt*.........St. Louis, Mo.
C. R. Peddle, *P. Agt*........Terre Haute, Ind.
Geo. H. Prescott, *S. M. P. & M.* Terre Haute, Ind.
E. D. Carter, *M. C. B*......Terre Haute, Ind.
Chas. Butler, *M. M*............Effingham, Ill.
Clinton Idler, *Foreman* ... Indianapolis, Ind.
Terre Haute & So.-Eastern Ry. 4-9 g. 44 m. 2 lo. 145 c.
Geo. Atherton, *Supt*.........Terre Haute, Ind.
Texas Central Ry. *(See Hous. & Tex. Cen.)*
Texas-Mexican Ry. *(See Mex. Nat.)*
Texas Trunk R. R. 4-8½ g. 36 m. 2 lo. 8 cars.
Hugh Irwin, *Gen. Supt*...........Dallas, Tex.
Texas Western Ry. 3 g. 52 m. 2 lo. 44 cars.
Henry Hatch, *Gen. Man*........Houston, Tex.
T. F. Glispin, *M. M*.............Houston, Tex.
Texas & N. O. R. R. *(See Cen. Pac.; G. H. & S. A. Div.)*
Texas & Pacific. *(See Mo. Pac. Ry.; (6) Div.)*
Texas & St. Louis Ry. 3 g. 769 m. 84 lo. 2,000 cars.
W. R. Woodard, *Rec*...............St. Louis, Mo.
F. W. Paramore, *Pur. Agt* ....St. Louis, Mo.
G. W. Prescott, *S. M. P. & M* ...St. Louis, Mo.
A. E. Buchanan, *Supt*.........Pine Bluff, Ark.
Tex. Div., J. T. Gerry, *Supt*. ....Tyler, Tex.
Tionesta Valley R. R. 3 g. 15 m.
George Dickinson, *Gen. Supt* ....Sheffield, Pa.
Tioga R. R. 4-8½ and 6 g. 67 m. 18 lo. 960 cars.
R. Dupuy, *Supt*....................Blossburg, Pa.
J. C. Guthrie, *Pur. Agt*.....New York, N. Y.
Pere Bonny, *M. M*...............Blossburg, Pa.
D. H. Stratton, *M. C. B*.......Blossburg, Pa.
Toledo, Ann Ar. & Gr. Tr. Ry. 4-8½ g. 63 m. 9 lo. 186 c.
J. M. Ashley, *Gen. Man*......Ann Arbor, Mich.
H. W. Ashley, *Supt. & Pur. Agt*. do
C. C. Dodge, *M. M*..............Ann Arbor, Mich.
Toledo, Cin. & St. Louis R. R. 3 g. 798 m. 101 lo. 3,500 c.
E. P. Murray, *Gen. Supt*.............Toledo, O.
F. W. Stewart, *P. Agt*.................Toledo, O.
L. W. James, *Supt. Mach*...........Delphos, O.
Toledo Div.: W. H. Vandergrift, *Supt.*; do
Thos. Robertson, *M. M*..........Delphos, O.
J. S. Wiers, *For. Car Rep*........Delphos, O.
Del. & Cin. Divs.: C. A. Bell, *Supt*.......Cin., O.
T. J. Hamer, *M. M*..............Cincinnati, O.
So. D. & E. Div.: W. W. Cummings...Dayton, O.
W. H. Anderson, *M. M*..............Dayton, O.
St. Louis Div.: Frank F. Allen....Charleston, Ill.
P. H. Murphy, *M. M*..........Charleston, Ill.
Ironton Div.: C. C. Clark, *Supt*.....Ironton, O.
Toledo & Indianapolis R. R. 4-8½ g. 43 m. 4 lo. 118 c.
M. Clark, *Supt*..................................Toledo, O.
H. M. Swan, *M. M*...........................Toledo, O.
Toledo & South Haven R. R. *(See Paw Paw.)*
Tonawanda Val. & Cuba R. R. *(See Brad., B. & K.)*
Toronto, Grey & Bruce Ry. 4-8½ g. 191 m. 28 l. 446 c.
Edmund Wragge, *Gen. Man*...Toronto, Can.
W. Watson, *Pur. Agt* ....Toronto, Can.
David Preston, *M. M*..............Toronto, Can.
Toronto & Nipissing Ry. *(See Mid. Ry. of Can.)*
Troy & Boston R. R. 4-8½ g. 48 m. 20 lo. 484 cars.
D. Robinson, *Pres. & Pur. Agt*......Troy, N. Y.
Joseph Crandell, *Supt*. ....Troy, N. Y.
Z. B. Davis, *M. M*....................Troy, N. Y.
R. V. Coon, *M. C. B*..................Troy, N. Y.
Troy & Greenfield R. R. & H. Tunnel. 4-8½ g. 44 m.
A. W. Locke, *Man*..........North Adams, Mass.
Tuckerton R. R. 4-9 g. 31 m. 2 lo. 29 cars.
J. J. Pharo, *Supt. & Pur. Agt*. Tuckerton, N. J.

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Ulster & Delaware R. R. 4-8½ g. 74 m. 10 lo. 214 cars.
Jas. H. Jones, *Supt*...............Rondout, N. Y.
Joseph Rush, *M. M*...............Rondout, N. Y.
John H. Decker, *M. C. B* ....Rondout, N. Y.
Union Pacific Ry. (7 Gen. Divs.) 3 & 4-8½ g. 4,633 m. 510 lo. 10,550 cars.
S. H. H. Clark, *Gen. Man*..........Omaha, Neb.
Thos. L. Kimball, *Asst. Gen Man*. Omaha, Neb.
M. H. Goble, *Pur. Agt*..............Omaha, Neb.
I. H. Congdon, *S. M. P. & C. D*...Omaha, Neb
John Wilson, *Asst. do*................Omaha, Neb.
(1) Neb. Div.: P. J. Nichols, *Gen. Supt*..Omaha, Neb.
E. Div.: C. B. Havens, *Supt* .....Omaha, N. B.
R. McConnell, *M. M*.............. Omaha, Neb.
A. M. Collett, *M. C. B*............Omaha, Neb.
E. Sleppy, *M. M*...............G. Island, Neb.
L. Pole Div.: W. A. Deuel, *Supt*. Cheyenne, W. T.
J. H. McConnell, *M. M*.........N. Platte, Neb.
R. McDougall, *M. M*.........Cheyenne, W. T.
(2) Wy. Div.: E. Dickenson, *Gen. Supt*. Laramie, W. T.
T. E. Lewis, *M. M*. ....Laramie, W. T.
T. A. Davis, *M. M*..............Rawlins, W. T.
Wes. Div.: C. E. Wurtelle, *Supt*. Evanston, W. T.
Geo. F. Chapman, *M. M*.......Evanston, W. T.
(3) Idaho Div.: W. B. Doddridge, *Gen. Supt*. Ogden, U.
F. Rearden, *M. M*.............. Pocatello, Id.
Ogden Short Line Div.:
R. Blickensderfer, *Supt*.... .. Pocatello, Id.
Utah & Northern Div.:
W. P. P. St. Clair, *Supt*... ...Eagle Rock, Id.
W. J. Hemphill, *M. M*....... Eagle Rock, Id.
W. J. Hemphill, *M. M*. ....Eagle Rock, Id.
J. W. Paul, *Gen. For. C. D*...Eagle Rock, Id.
(4) Col. Cent. Div.: A. A. Egbert, *Gen. Supt*. Denver, Col.
F. Meirtsheimer, *M. M*. ....Denver, Col.
C. C. Div.: P. Touhy, *Supt*.........Denver, Col.
So. Park Div.: D. K. Sweet, *A. Supt*..Como, Col.
(5) Kan. Div.: S. T. Smith, *G. Supt*..Kansas City, Mo.
K. Val. Div.: J. O. Brinkerhoff, *Supt*. Kan. C'y, Mo.
Jas. Mackenzie, *M. M*. .... Armstrong, Kan.
Kansas Central Div.:
W. T. Kelley, *Supt*..... ..Leavenworth, Kan.
Smoky Hill Div.:
O. H. Dorance, *Supt*............Wallace, Kan.
J. B. Dailey, *M. M*. ....Ellis, Kan.
(6) Salt Lake & Western Div.:
W. W. Ritter, *Supt*.....Salt Lake City, Utah.
(7) Nevada Central Ry. 3 g. 93 m. 4 lo. 78 cars.
F. W. Dunn, *Gen. Supt. & P. A*. Battle Mt., Nev.
Z. T. Sprigg, *M. M*.......Battle Mountain, Nev.
United States Rolling Stock Co. 19 lo. 4,692 cars.
A. Hegewisch, *Pres*............New York, N. Y.
W. H. Chaddock, *Gen. Agt*........Chicago, Ill.
Upson County R. R. *(See Central of Ga.)*
Utah Central Ry. 4-8½ g. 280 m. 21 lo. 358 cars.
John Sharp, *Gen. Supt*...Salt Lake City, Utah.
S. H. Hill, *Pur. Agt*......Salt Lake City, Utah.
Geo. G. Bywater, *M. M*..Salt Lake City, Utah
Peter Reid, *M. C. B*.......Salt Lake City, Utah.
Utah & Nevada Ry. 3 g. 37 m. 3 lo. 33 cars.
W. W. Ritter, *Gen. Man*...Salt Lake City, Utah.
Robert Anderson, *M. M*...Salt Lake City, Utah.
Utah & Northern Ry. *(See Union Pac.; (3) Div.)*
Utah & Pleasant Valley Ry. *(See Den. & Rio. Gr.)*
Utica, Ithaca & Elmira Ry. 4-8½ g. 120 m. 11 lo. 152 c.
Geo. S. Sadler, *Supt* ....Elmira, N. Y.
Edw. Mahler, *Pur. Agt* ....Elmira, N. Y.
C. J. Howe, *M. M & M. C. B*. Breesport, N. Y.
Utica, & Black Riv. R. R. 4-8½ g. 180 m. 22 lo. 452 c.
J. F. Maynard, *Gen. Supt. & P. A*. Utica, N. Y.
John Bailey, *M. M*....................Utica, N. Y.
David James, *M. C. B*...............Utica, N. Y.

V

Vaca Vall. & Clear Lake R. R. 4-8½ g. 30 m. 2 lo. 19 c.,
G. B. Stevenson, *Gen. Supt*.....Vacaville, Cal.
Valley Ry. (Ohio) 4-8¾ g. 85 m. 15 lo. 581 cars,
J. E. Turk, *Supt. & P. Agt*........Cleveland, O.
Chas. Blanchard, *M. C. B*......Cleveland, O.
Valley R. R. Va. 4-8½ g. 62 m.
S. Spencer, *Pres* ....Baltimore, Md.
Vermont Valley R. R. *(See Conn. River.)*
Vicksburg & Brunswick R. R. *(See Cen. of Ga.)*
Vicksburg & Meridian R. R. *(See Cin., N. O. & Tex. Pac.)*
Vicks. Shreveport & Pac. R. R. *(See C., N. O. & T. P.)*
Victoria Ry. *(See Midland Ry. of Can.)*
Virginia Midland Ry. *(See Rich. & Dan.; (4) Div.)*
Virginia & Truckee R. R. 4-8½ g. 54 m. 17 lo. 375 c.
Carson & Colorado R. R. 3 g. 294 m. 6 lo. 134 c.
H. M. Yerington, *Gen. Supt*.... .. Carson, Nev.
R. J. Laws, *Supt*. (C. & Col.)..Hawthorne, Nev.
Hume Yerington, *Pur. Agt*........Carson, Nev.
I. N. Fording, *M. M*...............Carson, Nev.
M. M. Hyde, *M. C. B*............. Carson, Nev.

W

Wabash, Chester & W'n R. R. *(See St. Louis Coal.)*
Wabash, St. Louis & Pacific Ry. (4 Gen. Divs., 4-8½ g. 3,241 m. 598 lo. 17,230 cars.
A. L. Hopkins, *2d V. P*.......... St. Louis, Mo.
Robert Andrews, *Con. Eng*... ...St. Louis, Mo.
R. B. Lyle, *Pur. Agt*.............St. Louis, Mo.
Jacob Johann, *Gen. M. M*......Springfield, Ill.
U. H. Kohler, *Gen. M. C. B*... ....Toledo, O.
(1) Eas'n Div.: G. W. Stevens, *Supt*........Peru, Ind.
J. B. Barnes, *M. M*........Fort Wayne, Ind.
John McKenna, *M. M*............. Peru, Ind.
Cairo Div.: W. S. Morris, *M. M* ......Carmi, Ill.
Rant'l Div.: B. F. Mathias, *Asst. Supt*. Rantoul, Ill
J. McCarthy, *M. M*........... ....Rantoul, Ill
(2) Middle Div.: H. F. Clark, *Supt*....Springfield, Ill.
B. B. Rose, *M. C. B*.............Decatur, Ill.
G. A. Hurd, *Asst. Supt*. ....Forest, Ill.
(3) Northern Div.: E. N. Armstrong, *Supt*. Peoria, Ill.
R. M. Hemphill, *M. C. B*.........Peoria, Ill.
E. B. Hyde, *Asst. Supt* .... Havana, Ill.
(4) Western Div.: R. S. Miner, *Supt*.....Moberly, Mo
W. H. Selby, *M. M*................Moberly, Mo.
C. S. Buck, *M. C. B*................Moberly, Mo.
E. Dresser, *Asst. Supt*...........Stanberry, Mo
D. Moin. Div.: C. F. Meek, *A. Supt*. Des Moines, Ia
Walden's Bridge R. R. 3 g. 23 m. 3 lo. 37 cars.
John G. Scott, *Gen Man* ...Jenks P. O., Tenn.
Walkill Ry. *(See N. Y., West. Sh. & Buf.)*
Walla Walla & Columbia Riv. R. R. *(See Ore. Ry.)*
Walton R. R. 5 g. 10 m. 1 lo. 7 cars.
D. H. Walker, *Pres* ....Monroe, Ga.
Warren & Farnsworth Valley R. R. 3 g. 11 m. 3 lo. 39 cars.
A. D. Wood, *Supt*.......... .....Warren, Pa.
Warwick Valley R. R. *(See Leh. & Hud. River.)*
Wasatch & Jordan Valley R. R. *(See Den. & Rio. Gr.)*
Washington, Ohio & West. R. R. 4-8½ g. 52 m. 5 lo. 87 c.
S. M. Brophy, *Supt* ... . Alexandria Va.
Edward Dunn, *M. M*...........Alexandria, Va.
John Harrison, *M. C. B*.......Alexandria, Va.
Waynesburg & Washington Rd. 3 g. 29 m. 3 lo. 26 c.
C. E. Bower, *Supt*..............Waynesburg, Pa.
A. M. Kline, *M. C. B*.... .....Waynesburg, Pa.
Welland Ry. 4-8½ g. 25 m. 4 lo. 147 cars.
William Pay, *Supt*.........St. Catharines, Ont.
Jas. Taylor, *M. M*... ....St. Catharines, Ont.
Wm. H. Pay, *M. C. B*......St. Catharines, Ont.
West End Narrow Gauge Ry. 3 g. 16 m. 3 lo. 13 c.
Rolla Wells, *Supt*.................. St. Louis, Mo.
M. M. Hodgman, *M. M*..........Florissant, Mo
West Feliciana R. R. 4-8½ g. 27 m. 2 lo. 22 cars
J. B. McGehee, *Pr. & Gen. Supt*. Bayou Sara, La.
J. A. Tilton, *M. M. & C. B*.....Bayou Sara, La
W. Va., Central & Pittsb'g Ry. 4-8½ g. 50 m. 4 lo. 119 c.
T. B. Davis, *Gen. Man*........Piedmont, W. Va.
W. E. Porter, *Gen. Supt*......Piedmont, W. Va.
Geo. W. Harrison, *Pur. Agt*...Piedmont, W. Va.
E. W. Lippencott, *M. M*.....Piedmont, W. Va.
West & East R. R. *(See Ill. Cen.; N. O. Div.)*
West Jersey R. R. *(See Penn. R. R.; (3) Div.)*
Western R. R. (of Ala.) 5 g. 85 m. 15 lo. 270 cars.
Atlanta & W. Point Rd. 5 g. 87 m. 14 lo. 240 c.
Cecil Gabbett, *Gen. Man. & Supt*...Mont., Ala.
C. D. Wall, *M. M. & C. B* ..Montgomery, Ala.
Western Counties' Ry. 4-8½ g. 67 m. 8 lo. 137 cars
J. Brignell, *Supt* ....Yarmouth, N. S.
Western Maryland R. R. 4-8½ g. 157 m. 25 lo. 439 c.
J. M. Hood, *Pr. & Gen. Man*....Baltimore, Md.
R. J. Adair, *Pur. Agt*.......... Baltimore, Md.
David Holtz, *Mast. of Mach*..Union Bridge, Md.
J. H. Nussear, *M. C. B*......Union Bridge, Md.
Western No. Carolina R. R. 5 g. 210 m. 17 lo. 160 c.
V. E. McBee, *Supt*..............Salisbury, N. C.
Jos. P. Minetree, *Pur. Agt*.......Richmond, Va
G. W. Gates, *M. M*.......... .....Salisbury, N. C.
Western & Atlantic R. R. 5 g. 138 m. 58 lo. 952 c
R. A. Anderson, *Gen. Supt*.........Atlanta, Ga.
A. B. Bostwick, *Asst. Supt*........ Atlanta, Ga.
John H. Flynn, *M. M. & C. B*.....Atlanta, Ga
Wheeling, Pittsburg & Baltimore R. R.. *(See B. & O.)*
Wheeling & Lake Erie R. R. 267 m. 31 lo. 1,456 c.
M. D. Woodford, *Gen. Man*....... ..Toledo, O.
O. P. Dunbar, *Gen. M. M*...........Norwalk, O.
John Hillhouse, *Div. M. M*........Norwalk, O.
Cleve. & Mar. Div.:
A. Galloway, *Div. M. M*...... Cambridge, O.
Whitby, Port Perry & Lindsay Ry. *(See Mid. of Can.)*
White Water R. R. *(See Ft. W., Cin. & Lou.)*
Whitefield & Jefferson R. R. *(See Bos., Con. & Mon.)*
Whitneyville & Machiasport R. R. 8 m. 2 lo. 48 c.
C. Sullivan, *G. M. & Pur. Agt*. Whitneyville, Me.
Wicomico & Pocomoke R. R. 4-8½ g. 30 m. 2 lo. 38 c.
L. Showell, *Pres*.................. ....Berlin, Md.
Williamsport & North Branch R. R. 4-8½ g. 9 m. 2 lo. 4 cars.
B. G. Welch, *Man. & P. Agt*...Hughesville, Pa.
J. V. Chamberlain, *Supt. & M. M*. do.
Williamstown & Del. River R. R. 4-8½ g. 9 m. 1 lo. 10 cars.
Samuel Garwood, *Supt* ...Williamstown, N. J.
Wilmington, Columbia & Augusta R. R. *(See W. & W.)*
Wilmington & No'n R. R. 4-8¾ g. 85 m. 16 lo. 148 c.
J. H. Thompson, *Supt. & P. A*..Coatesville, Pa.
George Rommel, *M. M*.........Coatesville, Pa
Alex. Maitland, *M. C. B*........Coatesville, Pa.
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R. R. Bridgers, *Gen. Man*....Wilmington, N. C.
J. F. Divine, *Gen. Supt*.......Wilmington, N. C.
John Bisset, *M. M*...........Wilmington, N. C.
W. H. Day, *M. C. B*..............Florence, S. C.
J. H. Davis, *M. C. B.* (W. & W.) Wilmington, N. C.
Winifrede R. R. 4-9 g. 5 m. 1 lo. 65 cars.
Theodore Wright, *Pres*........Philadelphia, Pa.
Windsor & Annapolis Ry. 4-8½ g. 130 m. 10 lo. 160 c.
P. Innes, *Gen. Man*.............Kentville, N. S.
Wm. Yould, *M. M* ....Kentville, N. S.
Wm. Grierson, *M. C. B*..........Kentville, N. S.
Wisconsin Central R. R. 4-8½ g. 480 m. 49 lo. 1,800 c.
F. N. Finney, *Gen. Man*........Milwaukee, Wis.
E. K. Howes, *Pur. Agt*........Milwaukee, Wis.
W. A. Short, *Supt. M. P. & M*..Stevens Pt., Wis.
Mil. & E'n Divs.: A. A. Allen, *S*..Milwaukee, Wis.
Wis., Minn. & S. M. & N. Div.:
W. E. Carroll, *Supt*.. ......Stevens Point, Wis.
Wisconsin, Iowa & Nebraska.
G. C. McMichael, *Supt*.......Marshalltown, Ia.
Wisconsin & Michigan R. R. *(See Mil. & North'n.)*
Wisconsin & Minnesota R. R. *(See Wis. Cen.)*
Wood River Branch R. R. 4-8½ g. 6 m. 2 lo. 3 cars.
L. M. Barber, *Supt*....... Hope Valley, R. I.
Woodstock R. R. 4-8½ g. 14 m. 1 lo. 3 cars.
J. G. Porter, *Supt*..............Woodstock, Vt.
Worcester R. R. (Md.) *(See Del., Md. & Va.)*
Worcester, Nashua & Rochester R. R. 4-8½ g. 95 m. 20 lo. 523 cars.
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G. W. Hurlburt, *Supt*..........Worcester, Mass.
John G. Brady, *M. M. & C. B*. Worcester, Mass
Worcester & Shrewsbury R. R. 3 g. 3 m. 3 lo. 9 c.
J. J. Coburn, *Supt*.............Worcester, Mass.
G. E. Hapgood, *Pur. Agt* ...Worcester, Mass.
Chas. Cleveland, *M. M* ....Worcester, Mass.
Worcester & Somerset R. R. *(See N. Y., Phil. & Nor.)*

Y

York & Peach Bottom Ry. 3 g. 40 m. 4 lo. 74 c.
S. M. Manifold, *Supt. & Pur. Agt*....York, Pa.
S. J. Williams, *M. M*............ ......York, Pa.
Youghiogheny R. R. 4-9 g. 12 m.
Wm. Wilson, *Supt*..................Irwin's, Pa

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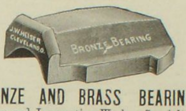

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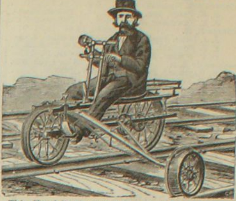

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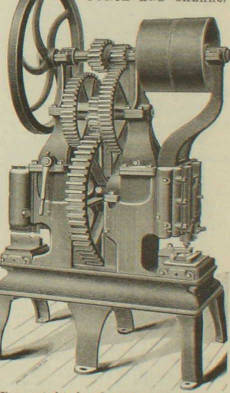

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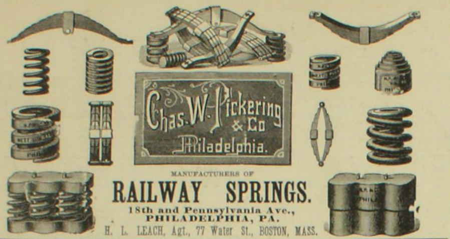
"	40	15	22	4	4.10	57,000	35,000	"	3,800.00
M. S. & N. I. Ry.... ...	53	15	20	4	4.10	58,000	35,000	"	4,500.00
" "	88	16	22	4	5	60,000	36,000	"	4,000.00
Amoskeag..............	228	15	22	4	5	57,000	35,000	"	3,500.00
N. J. Lo. Works...	233	16	22	4	5	60,000	35,000	"	5,000.00
Amoskeag	496	16½	22	4	5	59,000	36,000	"	3,500.00
L. S. & M. S. Ry........	217	16	22	4	5	58,000	36,000	"	3,500.00
Cuyahoga...........	226	16	22	4	5	55,000	35,000	"	3,000.00
L. S. & M. S. R'y.... ...	227	16	22	4	5	58,000	36,000	"	3,500.00
Manchester.............	229	16	22	4	5	58,000	36,000	"	3,500.00
Cuyahoga.....	230	16,	22	4	5	57,000	36,000	"	3,500.00
L. S. & M. S. Ry.... ...	201	16	22	4	5	58,000	36,000	"	3,500.00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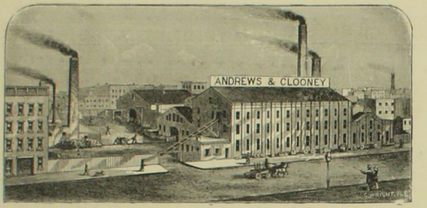

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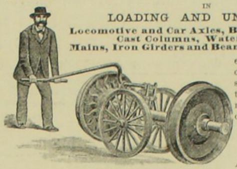

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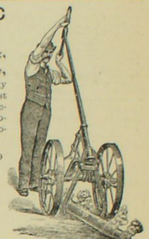

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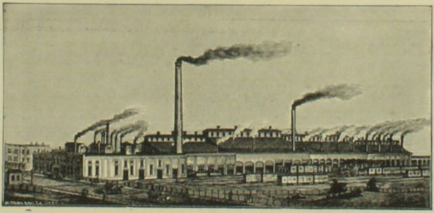

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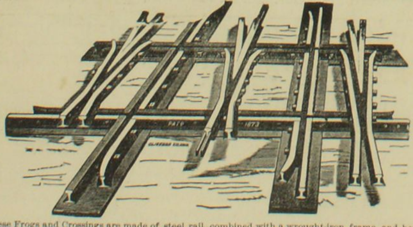

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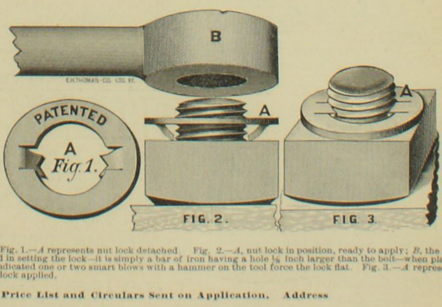

Fig. 1.—*A* represents nut lock detached. Fig. 2.—*A*, nut lock in position, ready to apply; *B*, the tool used in setting the lock—it is simply a bar of iron having a hole 1/8 inch larger than the bolt—when placed as indicated one or two smart blows with a hammer on the tool force the lock flat. Fig. 3.—*A* represents the lock applied.

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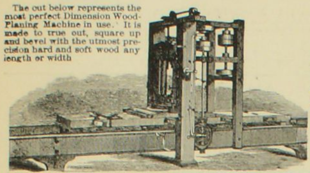

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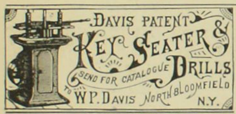

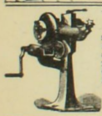

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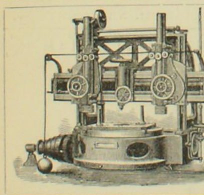

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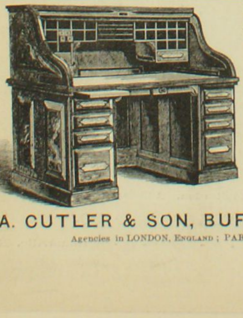

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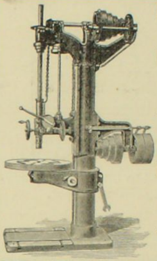

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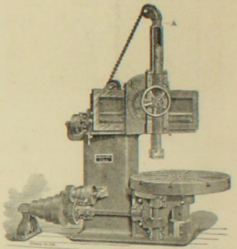

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